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## Architectural abbreviations dictionary

Engineering drawing abbreviations and symbols are used to communicate and detail the characteristics of an engineering drawing. This list includes abbreviations common to the vocabulary of people who work with engineering drawings in the manufacture and inspection of parts and assemblies. Technical standards exist to provide glossaries of abbreviations, acronyms, and symbols that may be found on engineering drawings. Many corporations have such standards, which define some terms and symbols specific to them; on the national and international level, ASME standard Y14.38[1] is one of the widely used standards. Jump to: O • P • Q • R • S • T • U • V • W • X • Y • Z • see also Abbreviation or symbol Definition Description 0-9   A   AC across corners Commonly used when measuring the corners of a hex drive, such as a hex nut. AF across flats Commonly used when measuring the flat surfaces of a hex drive, such as a hex nut. AFF above finished Flare A dimension that establishes a distance away from the finished floor. Example would be the top of a coffee table to the shag of the carpet, not where the bottom of the tables feet dig in. AISI American Iron and Steel Institute The AISI acronym is commonly seen as a prefix to steel grades, for example, "AISI 4140". The SAE steel grade system was formerly a joint AISI-SAE system. Al or AL aluminum ALY alloy AMER American Referring to the United States AMS Aerospace Material Standards Standards in materials science and engineering maintained by SAE International and widely used in the aerospace manufacturing industries. AN. Army Navy A prefix for standard hardware (catalog hardware) ID numbers. Came from the era of circa 1890s-1945, when the U.S. Army and Navy were leading the way on product standardization for logistics improvement, yielding the United States Military Standards system. Today industry and ISO also do a lot of this standardization specification, freeing the U.S. DOD and military to do less of it (as explained at United States Military Standard > Origins and evolution), although many MIL standards are still current. (See also MS- and NAS.) ANN anneal, annealed ANSI American National Standards Institute And the many standards that it issues, for example, ANSI Z87.1. APPROX[2] approximately AQL acceptable quality level The threshold of defectiveness that is allowable in a group of parts. It is trivial to say that no one wants any error, and that everyone wants uniform perfection; but in the real world, it almost never happens. The intelligence behind defining AQLs is in figuring out how much error is tolerable given the costs that would be incurred by any efforts to further reduce its incidence. AR as required An abbreviation used in parts lists (PLs, LMs, BoMs) in the quantity-per-assembly field when a discrete count is not applicable. For example, in an assembly with a bolted joint using four bolts, the PL quantity column will say "4" for the bolt PN, "4" for the nut PN, and "AR" for the liquid threadlocker that will be applied. AS Aerospace Standards; Australian Standards 1. Aerospace Standards, technical standards maintained by SAE International and widely used in the aerospace manufacturing industries. Standard aerospace hardware sometimes has the AS- prefix in the catalog numbers. 2. Australian Standards, standards per Australian industry. AS, APS, APV, AV, APSL, AVL approved product supplier, approved vendor, approved-product-supplier list, approved-vendor list When only certain companies are approved by the CDA to manufacture the product (that is, to make what the drawing depicts/defines), they are called by names such as "approved supplier", "approved product supplier", "approved vendor", or "approved product vendor". The list of such companies (which usually changes over time) is called an APSL, AVL, or similar names. Vetting the companies on this list requires the CDA to audit (and possibly periodically re-audit) the companies, which incurs an overhead expense for the CDA. Therefore, smaller companies will often cite larger companies' lists in order to avoid the cost of duplicating the effort. ASA American Standards Association Former name for ANSI (1920s-1960s). ASME American Society of Mechanical Engineers And the many standards that it issues, for example, ASME Y14.5. ASSY or ASY assembly referring to an assembly of parts rather than just one (sub)part ("piece part", "detail part"). ASTM Formerly the American Society for Testing and Materials; now ASTM International Maintains technical standards, especially regarding materials science and engineering and metrology. AVG average AVG American Wire Gauge B   BASIC basic dimension A basic dimension is one that is the theoretical value without any tolerance range. It does not serve as an acceptance criterion. It is thus similar in some respects to a reference dimension. The reason why a basic dimension does not carry a tolerance is that its actual value will fall (acceptably) wherever it is put by other features' actual values, where the latter features are the ones with tolerances defined. A common and simple example is hole location: If a hole's centerpoint location has a position tolerance, then the centerpoint's coordinates do not need (and should not have) separate tolerances applied to them. Thus they are instead given as basic dimensions. In modern practice basic dimensions have a rectangular box around them, or sometimes the word "BASIC". BC or B.C. bolt circle BCD or B.C.D. bolt circle diameter BHC bolt hole circle Same definition as the bolt circle diameter BHCS button head cap screw Like an SHCS but with a button head. BHN Brinell hardness number BoM or BOM bill of materials Also called a list of materials (LM or L/M). Overlaps a lot in concept with a parts list (PL or P/L). There is no consistently enforced distinction between an L/M, a BoM, or a P/L. BoP or BOP bought out part A part which is outsourced from an external supplier, or "bought out". BP, B/P blueprint "per B/P" = "per drawing" BRZ bronze BSC basic dimension See basic dimension info above. C   CAD computer-aided design, computer-aided drafting; cadmium (plating) CAGE Commercial and Government Entity [code] A CAGE code is a unique identifier to label an entity (that is, a specific government agency or corporation at a specific site) that is a CDA, ODA, or MFR of the part defined by the drawing. One corporation can have many CAGE codes, as can one government, because each division, department, and site (campus) can have its own CAGE code. The same CAGE code can change owners over the years. For example, a CAGE code that formerly referred to a certain Martin Marietta site will now refer to Lockheed Martin at that same site (although the buildings may have been replaced and the signage may say different names). C/C or C/TO-C centre-to-centre; on centres Defines centre-to-centre distance of two features, such as two holes. CBN cubic boron nitride A material from which some cutter inserts are made. CDA current design activity The CDA is the entity (whether it be a corporation, a unit of a national military or ministry of defense, or another civilian government agency) that currently has design authority over the part design (definition). It may be the entity who first designed the part (that is, the ODA), but today it is also likely to be a designated successor entity, owing to mergers and acquisitions (M&A) activity (e.g., ODA company was bought by CDA company); contract letting (e.g., an Army engineering department ODA turns over the design activity to the prime contractor that makes most or all of the parts, turning that contractor into the new CDA); privatization (e.g., a government privatizes the design and manufacture of materiel, and a state arsenal [state armory] ODA transfers design authority to a private armory [defense contractor] ODA); or patent licensing (e.g., a patent-holding inventor [ODA] licenses one or several companies to manufacture products using his intellectual property, in which case the "same" part could end up with multiple design authorities, although they may not be considered the official/nominal CDA). CERT or cert certification For example, certification of metallurgical content and processes CG centerless ground, centerless grinding Center mark Defines the center of a circle or partial circle. CH chamfer CHAM chamfer CI cast iron No longer a commonly used abbreviation. Better spell out for clarity. CL or C centreline or centerline; class 1. Center line, the central axis of a feature. 2. Class, for example, "paint per spec XYZ revision C type 1 class 2" may be abbreviated as "paint per spec XYZ REV C TY 1 CL 2" or even in some cases "paint per spec XYZ-C-1-2". (The latter practice is not uncommon but is cryptic for workers with minimal training and experience. The first two options are better practice.) CNC computer numerical control CR control rod Radius of an arc or circle, with no flats or reversals. This strict version of radius definition is specified in demanding applications when the form of the radius must be controlled more strictly than "just falling within the dimensional tolerance zone". It is poor engineering to specify a CR instead of an R simply on the theory of enforcing good workmanship. CR is for critical features whose performance truly requires near-perfect geometry. Like most such characteristics, its presence increases the price of the part, because it raises the costs of basic manufacturing and quality assurance. CRES corrosion-resistant [steel] Largely synonymous with stainless steel, unless specific grades, specs, and distinctions are made on the drawing. Some people treat CRES as a subset of the stainless steels. CRS cold rolled steel, on centres Defines centre-to-centre distance of two features, such as two holes. C/T Correlation / Tracking C/BORE or CBORE or counterbore CSK or CSINk or countersink CTN, ctn carton D   depth, deep, down Defines the depth of a feature. d[2] diameter Diameter of a circle. In a feature control frame (FCF), the ø symbol tells you that the tolerance zone for the geometric tolerance is cylindrical. Abbreviations for "diameter" include ø, DIA, and D. D diameter; delta Abbreviations for "diameter" include ø, DIA, and D. D diameter; delta Abbreviations for "diameter" include ø, DIA, and D. D. For delta usage, see for example "delta notes". DIA[2] diameter Diameter of a circle. Abbreviations for "diameter" include ø, DIA, and D. DIP ductile iron pipe DIM dimension, dimensioning DO, do ditto Seen occasionally in older drawings instead of repeating a given dimension. DOD, DoD [U.S.] Department of Defense See also MOD. DPA digital product definition A synonym of MBD. DWG, dwg drawing Referring to the engineering drawing E   ED edge distance Drilled holes, and fasteners are commonly required to have a minimum edge distance (min ED). EO, ECO, ECN engineering order An order from the engineering department (to be followed by the production department or vendor). Conting/superseding a detail on the drawing, which gets superseded with revised information. Also called by various other names, such as engineering change order (ECO), engineering change notice (ECN), drawing change notice (DCN), and so on. See also REV. EOL equal, equally For example, "ø10 4X EOL SPACED F/N or F/L" means "drill four holes of 10mm diameter equally spaced around the bolt circle." ERC electrical rule check EXIST, existing F   f finish An italic f (Latin small letter f) written on a line representing a surface was an old way of indicating that the surface was to be machined rather than left in the as-cast or as-forged state. The "f" came from "finish" in the sense of "machine finish" as opposed to raw stock/casting/forging. Later the ASA convened upon a letter V (specifically a sans-serif V) touching the surface. Soon this evolved into the "check mark" sign with accompanying number that tells the reader a max roughness value (RMS, microinches or micrometres) for the machined finish, to be measured with a profilometer. FAO finish all over A note telling the manufacturer that all surfaces of the part are to be machined (as opposed to leaving any surfaces as-cast or as-forged). Not an obsolete usage, but not seen as commonly as it was decades ago; not least because parts that once would have been spot-faced castings are now likelier to be contoured from billet with CNC milling. But more importantly, best engineering practice today, reflecting design for manufacturability and avoidance of spurious cost drivers, is either to specify specific, quantifiable requirements for surfaces with specific needs (such as RMS roughness measurements in microinches or micrometres, plus any plating or painting needs), or to leave finish out of the part definition (and thus at the manufacturer's discretion) because it is not important to fit, function, or critically. This same spirit is behind the shift in military standards from writing requirements about methods to writing them instead about performance, with the method to reach that goal being up to the ingenuity of the designer. FCF feature control frame The rectangular box (with several cells) that carries geometric tolerances in GD&T. It typically tells you what sort of geometric condition (e.g. parallel, perpendicular, round, cylindrical), followed by what size (and maybe shape) the tolerance example is, and finally which datums it relates to, the order of which against them, and what material condition applies to them (LMC, MMC, or RFS). A diameter symbol (ø) tells you that the zone for the geometric tolerance is cylindrical. FD or F/D field of the drawing The [main] field of the drawing, as opposed to other areas of it, such as the parts list (P/L), general notes (G/N), flagnotes (F/N or F/L), title block (T/B), rev block (R/B), bill of materials (B/M or BoM or BOM), or list of materials (L/M). Rationales for drawing changes that are noted in the rev block often use these abbreviations for brevity (e.g., "DIM 14.00 was 12.50; added default TOL info to T/B; added leader lines to F/D; added alternate hardware IDs to T/B; added alternate ally to L/M). FIM full indicator movement See also TIR. FL flag note, flagnote A note that is called out in specific spots in the field of the drawing. It is numbered with a stylized flag symbol surrounding the number. A general note applies generally and is not called out with flags. FL Floor Level Floor Level of an existing or proposed building or concrete pad FN or F/N flag note, flagnote; find number 1. Flagnote: A flagnote is a note that is called out in specific spots in the field of the drawing. It is numbered with a stylized flag symbol surrounding the number (or sometimes a delta symbol). A general note applies generally and is not called out with flags. 2. Find number: "FN" meaning "find number" refers to the ordinal number that gives an ID tag to one of the constituents in a parts list (list of materials, bill of materials). Thus "fasten using FN7" refers to a fastener that is "find number" 7 in the list. FoS feature of size A type of physical feature on a part. An FoS is a feature that can have size associated with it, usually involving the opposition of two surfaces (e.g., the two diametrically opposite sides of a hole wall; the two opposite walls of a slot or flange). Features of size (FoSs) in reality always have actual sizes and forms that differ from their theoretical size and form; the purpose of tolerancing is to define whether the difference is acceptable or not. Thus material condition (LMC, MMC, somewhere in between, or RFS) is important in GD&T. A given geometric tolerance may be defined in relation to a certain FoS datum being at LMC or at MMC. FS far side The drawing notations Also side and "far side" tell the reader which side of the part a feature is on, in occasional contexts where that fact is not communicated using the rules of projection alone. Contexts of usage are rather limited. One example is hole locations. "3X AND 3X FAR SIDE" defines symmetrical groups of 3 holes on both sides of a part (6 total), without having to redefine equivalent hole center coordinates on two separate views, one for each group. This is not only a convenience for the designer but also a method of error prevention, because it provides a way to avoid forking geometric definition that ideally should be kept unified to prevent discrepancies. For example, the groups defined above cannot accidentally become asymmetrically discrepant in a future revision by the revisor failing to revise both groups equally (because their definition is unified in only one place). Another example is part marking locations. An area for part identification marking can be circled on a top view but attempted to either the top or bottom of the part simply with a "near side" or "far side" notation—which obviates adding any otherwise-unneeded bottom view to the field of the drawing. FSCM Federal Stock/Supply Code for Manufacturers An older name for "CAGE code". Also NSCM (National Stock/Supply Code for Manufacturers). FTT fitting G   GCI gray cast iron Gd&T or GDT geometric dimensioning and tolerancing A standardized language for defining and communicating dimensions and tolerances. GN or G/N general notes (s) Most engineering drawings have a notes list, which includes both general notes and flag notes. H HBW hardness, Brinell, tungsten tip See Brinell scale. (The "W" comes from the element symbol for tungsten, W, which comes from the German Wolfram.) HDPE high-density polyethylene HHCS hex head cap screw HRA hardness, Rockwell, A scale See Rockwell scale. HRB hardness, Rockwell, B scale See Rockwell scale. HRC hardness, Rockwell, C scale See Rockwell scale. HRS hot rolled steel HT TR heat treat, heat treatment H&T or H/T or HT hardened and tempered A form of heat treatment in which the metal is first hardened and then tempered. Compare N&T. I   IAW in accordance with A common need in engineering drawings is to instruct the user to do activity X in accordance with a certain standard Y. For example, "Weld all subassemblies IAW AWS XYZ.123" means "Weld all subassemblies in accordance with American Welding Society standard number XYZ.123" (the number is hypothetical in this example). The word "I" is not strictly equivalent to "IAW" in such contexts thus "rivet all sheet metal per MIL-PRF-123456" or "[...] IAW MIL-PRF-123456". Part of the motivation behind the choice of words "in accordance with" is that they do not allege that any particular activity is explicitly specified by standard XYZ.123 (which "per" could be interpreted as alleging, at least in connotation); rather, these words merely instruct the user that whatever s/he does must not contradict the standard in any way. But this is a subtle connotative distinction, and "per" and "IAW" are denotatively equivalent. ID inner diameter; identity, identification number IED Insufficient Edge Distance Drilled holes commonly have a required minimum edge distance. If the inspection finds that the edge distance is below minimum, then commonly reported as having an IED condition. ISO International Organization for Standardization And the many standards that it specifies, for example, ISO 10303 J   JIS Japan Industrial Standard Reference to standards published by the Japanese Standards Association K   KEY key Drawing callouts marked "KEY" define "key characteristics" that are considered especially important for fit, function, safety, or other reasons. They are thus subjected to higher inspection sampling levels. KPSI, ksi kilopounds per square inch, that is, thousands of pounds per square inch See discussion at synonym KSI. KSI, ksi kilopounds per square inch, that is, thousands of pounds per square inch KSI (or ksi), also abbreviated KPSI or kpsi, is a common non-SI measurement scale for ultimate tensile strength, that is, the number of units of tensile force that a material can endure per unit of cross-sectional area before breaking. In the SI system, the unit is the pascal (Pa) (or a multiple thereof, often megapascals (MPa), using the mega- prefix); or, equivalently to pascals, newtons per square metre (N/m²). L   LDD limited dimension drawing An implementation of model-based definition that still uses a 2D drawing, but only containing critical information. All information missing from the drawing is to be pulled from a 3D model of the part or assembly. LH left-hand Referring to handedness, such as the helix handedness of screw threads or the mirror-image handedness of a symmetrical pair of parts. RHR roughness height, reading See surface roughness. RA, Ra roughness, average, Rockwell, A scale See surface roughness; see Rockwell scale. RB, Rb Rockwell B scale See Rockwell scale. RC, Rc Rockwell C scale See Rockwell scale. REF or (I2) reference The dimension or note is given only for reference and thus is not to be used as a part acceptance criterion (although it may be used as an aid to production or inspection). The dimension may also be surrounded by parentheses to signify a reference dimension. When a dimension is defined in one view but also mentioned again in another view, it will be given as reference in the second case. This rule prevents the mistake of defining it in two different ways accidentally; the "main" (non-reference) mention is the only one that counts as a feature definition and thus as a part acceptance criterion. See also basic dimensions, which are similar in some respects. REQD or REQ'D required For example, "4 REQD" written next to a fastener means that four of those fasteners are required for the assembly. REV revision Engineering drawings and material or process specifications are often revised; the usual revision control convention is to label the versions A, B, C, D, etc.; a revision block (rev block) is a tabular area on the drawing (typically in the upper right corner) that lists the revision letters, a brief description of the changes and reasons, and approval initials and dates. Revisions beyond "Z" start the alphabet over again with doubling, e.g., AA, AB, AC, AD, and so on. In the days of manual drafting, redrawing was expensive, so engineering orders (EOs, ECOs, ECNs) were not always incorporated into a next-letter revision. They thus accompany the drawing as part of the TDP. With the dissemination of software usage (CAD, CAM, PDMs), revision control is often better handled nowadays, in competent hands at least. In recent years the revision control of engineering drawings has even been standardized by ASME, in their standard Y14.35M. [5] RPS regardless of feature size A material condition (or more precisely, freedom from such) in GD&T. Means that a given geometric tolerance is true in relation to a certain datum regardless of its actual size (LMC = actual size ± MMC). RH right-hand Referring to handedness, such as the helix handedness of screw threads or the mirror-image handedness of a symmetrical pair of parts. RHR roughness height, reading See surface roughness. RL Reduced Level or Relative Level Surface Level RMA return material authorization See also RTV. RMS roughness, average, Rockwell, A scale See surface roughness; see Rockwell scale. RB, Rb Rockwell B scale See Rockwell scale. RC, Rc Rockwell C scale See Rockwell scale. REF or (I2) reference The dimension or note is given only for reference and thus is not to be used as a part acceptance criterion (although it may be used as an aid to production or inspection). The dimension may also be surrounded by parentheses to signify a reference dimension. 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