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Architectural abbreviations dictionary

Engineering drawing abbreviations and symbols are used to communicate and detail the characteristics of an 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 level, ASME standards, which define some terms and symbols specific to them; on the national level, ASME standards, which define some terms and symbols specific to them; on the national level, ASME standards, which define some terms and symbols specific to them; on the national level, ASME standards, which define some terms and symbols specific to them; on the national level, ASME standards, which define some terms and symbols specific to them; on the national level, ASME standards, which define some terms and symbols specific to them; on the national level, ASME standards, which define some terms are specific to them; on the national level, ASME standards, which define some terms are specific to them; on the national level, ASME standards, which define some terms are specific to them; on the national level, ASME standards, which define some terms are specific to them; on the national level, ASME standards, which define some terms are specific to the national level, ASME standards, which define some terms are specific to the national level, ASME standards, which define some terms are specific to the national level, as the nati 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 flat surfaces of a hex drive, such as a hex nut. AFF above finished floor 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 aluminium ALY alloy AMER American Referring to the United States AMS Aerospace Material 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 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 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 applied. AS Aerospace Standards; Australian Standards 1. Aerospace Standards naintained by SAE International and widely used in the aerospace manufacturing industries. Standards per Australian industry. AS, APS, APV, AV, APSL, AVL approved product supplier, approved vendor, approved supplier list, approved product supplier, "approved product supplier, "approved vendor, or "approved vendor, or "approved product supplier, approved supplier, approved product supplier, approved vendor, approved vendor, or "approved vendor, or "approved vendor, approved vendo 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 on this list requires 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 AWG American Wire Gauge B BASIC 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 but with a button head cap screw Like an SHCS but with a b consistently enforced distinction between an L/M, a BoM, or a P/L. BoP or BOP bought out and 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 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 defence, 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 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, centerl 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 controlled radius 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 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 countersink CTN, ctn carton D depth, deep, down Defines the depth of a feature. ø[2] diameter 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. 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. DOD, do ditto Seen occasionally in older drawings instead of repeating a given dimension. DOD, DoD [U.S.] Department of Defense See also MOD. DPD digital product definition A synonym of MBD. DWG, dwg drawing Referring to the engineering drawing E ED edge distance (min ED). EO, ECO, ECN engineering order An order from the engineering department (to be followed by the production department or vendor) overriding/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 (ECN), drawing change notice (ECN), drawing change notice (ECN), and so on. See also REV. EQL equal, equally For example, "ø10 4X EQL SPACED ON BC" means "drill four holes of 10mm diameter equally spaced around the bolt circle." ERC electrical rule check EXIST. existing 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 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 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 criticality. This same spirit is behind the shift in military standards from writing requirements about methods to writing them instead about methods to writing the writing them instead about methods to writing them instead about methods to writing the writing the writing the writing them instead about methods to writing the w (with several cells) that conveys geometric tolerances in GD&T. It typically tells you what sort of geometric condition (e.g., parallel, perpendicular, round, concentric), followed by what size (and maybe shape) the tolerance zone is, and finally which datums it relates to, the order of gaging 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 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 alternate alloy 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 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, bill 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 forms the forms that differ from the forms that differ from the forms the forms that differ from the forms the forms that differ from the forms that differ from the forms that differ from the forms the forms the forms that differ from the forms that differ from the forms that differ from the forms the forms the forms that differ from the forms the forms the forms that differ from the form tolerance may be defined in relation to a certain FoS datum being at LMC or at MMC. FS far side "the drawing notations "near 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 unforked 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 assigned to either the top or 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). FTG fitting G GCI gray cast iron GDT geometric dimensioning and tolerancing A standardized language for defining and communicating dimensions and tolerances. GN or G/N 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 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, B scale See Rockwell, B scale See Rockwell scale. HRC hardness, Rockwell, B scale See Rockwell scale. C scale See Rockwell scale. HRS hot rolled steel HT TR heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and tempered A form of heat treatment in which the metal is first hardened and the metal is first h technical 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 "per" is functionally equivalent to "IAW" in such contexts; thus "rivet all sheet metal per MIL-PRF-123456" or 'standard number XYZ.123" (the number is hypothetical in this example). [...] 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 is below minimum, then commonly reported as having an IED condition. ISO International Organization for Standards that it specifies, for example, ISO 10303 J JIS Japan Industrial 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, kpsi kilopounds per square inch, that is, thousands of pounds 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 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. LM or L/M list of materials (BoM, BOM). 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. LMC least material condition A material condition in GD&T. Means that a feature of size (FoS) is at the limit of its size tolerance in the direction that leaves the least material left on the part. Thus an internal feature of size (e.g., a hole) at its smallest thickness. The GD&T symbol for LMC is a circled L. (See also MMC and RFS.) A given geometric tolerance may be defined in relation to a certain FoS datum being at LMC or at MMC. M MACH machine; machined MAJ major As in major characteristic (for sampling level) MAX[2] maximum MBD model-based definition Definition of the part via a 3D CAD model rather than via a 2D engineering drawing. Drawings may be printed (plotted) from the model for reference use, but the model from the M/F make from When one part number is made from another, it means to take part A and machine some additional features into it, creating part B. The parts list or L/M, in the "material" field, will say "M/F PN 12345". MFD manufactured MFG manufa Military A prefix for the names of various United States Military Standards and Specifications, for example, MIL-STD-1397. MIL-S is at the limit of its size tolerance in the direction that leaves the most material left on the part. Thus an internal feature of size (e.g., a hole) at its biggest thickness. The GD&T symbol for MMC is a circled M. (See also LMC and RFS.) A given geometric tolerance may be defined in relation to a certain FoS datum being at LMC or at MMC. MOD, MoD Ministry of Defence [U.K. and others] See also DOD. MOP, MoP measurement over wires threads, splines, gears (external, male) (synonymous with MOW, measurement over wires) MOW, MoW measurement over wires threads, splines, gears (external, male) (see also MBW, MBP, MOP) MPa, MPA megapascals The common SI measurement scale for ultimate tensile strength (UTS), that is, the number of units of tensile force that a material can endure per unit of measurement symbol, properly should be preserved even when surrounding text is styled in all caps (which latter is a frequently employed tradition in engineering drawing). But it is not uncommon to see "MPA" through carelessness. Users are not confused regardless. In non-SI terms, the unit for UTS is the KSI (or ksi), which see herein. MRB material review board A committee that reviews some nonconforming materials which are submitted as potentially still usable/saleable (if the nonconformance does not hinder fit or function). MS- [U.S.] Military and civil) and other defense industries. Standard hardware sometimes uses the MS- prefix in the catalog numbers. (See also AN- and NAS.) N NAS National Aerospace Standards maintained by SAE International and widely used in the aerospace manufacturing industries. The "National" formerly implicitly referenced the USA, but today NAS and other standards are used globally. Standards hardware for aerospace work sometimes uses the NAS- prefix in the catalog numbers. (See also AN- and MS-.) NC National Coarse (UNC) of the Unified Thread Standard. NCM nonconforming material(s) This abbreviation is used in a machine shop when recording nonconformances (out of tolerance, etc.). For example, "An NCM tag was tied to the scrap part." NCR nonconformances (out of tolerance, etc.). Helps to analyze system weaknesses (such as worn-out equipment, operators in need of more training, or risky practices). NEC not elsewhere classified; National Electrical Code In the sense of "not elsewhere classified", the abbreviation is well-known within certain fields, but not others; to avoid confusion, spell out. The National Extra Fine The [U.S.] National Extra Fine series of pre-1949 corresponds today to the Unified National Extra Fine (UNEF) of the Unified Thread Standard. NF National Fine (UNF) of the Unified Thread Standard. NL or N/L notes list A list of notes that appears somewhere on the drawing, often in the upper left corner. NOM[2] nominal NORM or NORMD normalized referring to normalization, a stress-relieving heat treatment. See also HT TR. NPS Naval Primary Standard[3] (Not to be confused with annotating strait pipe as "NPS", which should instead be annotated NPSM, NPSL, or NPSH[4]) NPT National Pipe Taper A subset series of the Unified Thread Standard. NS National Special; near side 1. National Special, a screw thread series; see Unified Thread Standard. An extensible series, covering various special threads. 2. Near 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. See "far side" for examples. NSCM National Stock/Supply Code for Manufacturers An older name for "CAGE code". Also FSCM (Federal Stock/Supply Code for Manufacturers). N&T or N/T or N/T normalized and tempered. Compare H&T. NTS not to scale See also Engineering drawing > Scale. O OAL overall length OC on centre-to-centre; defines centre-to-centre distance of two features, such as two holes. OD outer diameter ODA original design activity The entity that originally designed a part. Compare to CDA, the entity that currently has design authority over the part design (definition). OHL over high limit This abbreviation is used in a machine shop when recording nonconformances. For example, "part scrapped because ID is OHL." See also ULL. OPP opposite See Part number > Symmetrical parts for explanation. ORIG original P pc, pcs piece, pieces PD pitch diameter PDM, PDMS product data management, product data management, product data manager [app], product data management system [app] A database(s) and related application(s) that facilitate all aspects of managing data files—e.g., TDPs, TDP versions, drawings, model datasets, specs, addenda, certs, memoranda, EOs, ECOs, DCNs, RFQs, quotes, POs, e-mails, faxes, photos, word processor documents, spreadsheets. See also PLM. PH or P/L parts list A list, usually tabular and often on the drawing (if not accompanying the drawing on a separate sheet), listing the parts needed in an assembly, including subparts, standard parts, and hardware. There is no consistently enforced distinction between an L/M, a BoM, or a P/L. PLM product lifecycle management; plant lifecycle management; plant lifecycle management See also PDM. PMI Product and manufacturing information Product and Manufactur Product Development systems necessary for manufacturing product components and assemblies. PN or P/N part number POI point of intersection A point that make easier the layout, toolpath programming, or inspection of the part. It is the intersection A point that make easier the layout, toolpath product components and assemblies. PN or P/N part number POI point of intersection A point that make easier the layout, toolpath programming, or inspection of the part. It is the intersection point of intersection A point that make easier the layout, toolpath programming, or inspection of the part. It is the intersection A point that make easier the layout, toolpath programming, or inspection of the part. theoretical sharp corner (TSC) that edge-breaking and deburring will remove. See also SC, TSC, and AC. P.F. press fit A fastening or mating between two parts which is achieved by friction after the parts are pushed together. PSI pounds per square inch A unit of measurement for pressure. See also KSI. PTFE polytetrafluoroethylene Also well known by the brand name Teflon. PVC polyvinyl chloride O OMS quality management system A system in place to ensure that quality of manufacture is produced and maintained; a system to prevent defective parts from being made, or, even if made, from getting into finished inventories. OTY or gty quantity R R radius Radius of an arc or circle. Flats and reversals (falling within the dimensional tolerance zone) are tolerance zone. REF or ()[2] 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 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, REOD or REO'D required For example, "4 REOD" 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 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, DCNs, 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, PDMSs), 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] RFS 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 \le 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 root mean square RMS in general is a statistical technique to define a representative value for a group of data points. With regard to surface roughness, it means that the heights of the individual microscopic peaks and valleys shall be averaged together via RMS to yield a measurement of roughness. See also herein f as a finish mark. RT or R/T rough turn, rough t roughness. Can apply to bar stock or to parts in-process. Room temperature is sometimes abbreviated "RT" within tables of specs for finishing operations (plating, painting, etc.). RTP release to production activity to the production activity. In other words, the event when a draft becomes a completed, official document. A stamp on the drawing saying "ISSUED" documents that RTP has occurred. RTV room-temperature vulcanizing; return to vendor for rework or refund because they are nonconforming. Such RTV often requires an RMA. RZ, Rz roughness, mean depth See surface roughness. S SAE Formerly the SAE AMS and SAE AS standards series. SC or S/C sharp corners Dimensions may be given as "across sharp corners" although the corners get radiused. In other words distances may be given from intersection points where lines intersect, regardless of edge breaks or fillets. This is usually implied by default, so "S/C" often need not be explicitly added. But in some cases it clarifies the definition. See also TSC, POI, and AC. SF or S/F spotface slip fit SFACE or S/FACE spotface SHCS socket head cap screw A cap screw with a socket head (usually implying a hex socket, driven with a hex key. SI Système international [d'unités] [International System of Units] The metric system in its current form (latest standards). SN or S/N serial number SOL ANN solution anneal, solution annealed SPEC or spec specification SPHER ANN spheroidize anneal SPOTFACE Spot facing SR spherical radius Radius of a sphere or spherical segment. SS or S/S stainless steel; supersede 1. Stainless steel, see also CRES. 2. Supersede/supersedes/supersedes/superseded, refers to when one document (specification, standard for the Exchange of Product Model Data A standard format defined by ISO 10303 for MBD data generation, storage, and exchange. STA solution treated and aged STI screw thread insert STL steel STK stock A nominal dimension for the stock SW Schlüsselweite Translates as Key or Wrench Width. Width across flats, often found on drawings of german origin. T TAP tapped hole Usually implies drilling a hole if the hole does not already exist. TB or T/B title block An area of the drawing, almost always at the bottom right, that contains the title of the drawing and other key information. Typical fields in the title block include the drawing and other key information. Typical fields in the title block include the drawing and other key information. Typical fields in the title block include the drawing and other key information. part (which involves some complication because design and manufacturing entities for a given part number often change over the years due to mergers and acquisitions, contract letting, privatization, and the buying and selling of intellectual property—see CDA and ODA); company name (see previous comment); initials/signatures of the original draftsman (as wells as the original checker and tracer in the days of manual drafting); initials/signatures of approving managers (issuance/release-to-production information); cross-references to other documents; default tolerancing values for dimensions, geometry, and surface roughness; raw-material info (if not given in a separate list/bill of materials); and access control information (information about who is authorized to possess, view, or share copies of the information encoded by the drawing, e.g., classification notices, patent numbers). Drawing revisions block. TCC time-current curve TDP technical data package of information that defines a part, of which the drawing itself is often only a subset. It also includes engineering orders (drawing change notices), 3D model datasets, data tables, memoranda, and any special conditions called out by the purchase order or the companies' terms-and-conditions documents. THD or thd thread THRD threaded THK or thk thickness THRU may be stated in a hole dimension if the hole's end condition is not clear from graphical representation of the workpiece. [6] THRU ALL Through all Similar to THRU. Sometimes used on hole dimensions for clarity to denote that the hole extends through multiple open space features as it goes through the whole workpiece.[7] TIR total indicator reading; t tolerance, tolerancing TSC theoretical sharp corner(s) See discussion at SC and POI. TY type For an explanation of "type" abbreviated as "TY", see the example given at "CL" meaning "class". TYP[2] Typical Other features share the same characteristic. For example, if the drawing shows 8 holes on a bolt circle, and just one is dimensioned, with "TYP" or "(TYP)" following the dimension label, it means that that hole is typical of all 8 holes; in other words, it means that the other 7 holes are that size also. The latest revisions of Y14.5 deprecate "TYP" by itself in favor of the specifying of a number of times, such as "2X" or "8X". This helps avoid any ambiguity or uncertainty. TYP or Typical was described in Mil-Std-8, the directing body prior to adoption of the dimension tolerance interpretation Y14.5 series. Its last revision was C in 1963, but can still be found in many older aircraft drawings. U UAI use as-is One of the possible MRB dispositions. Others include scrap and rework. ULL under low limit This abbreviation is used in a machine shop when recording nonconformances. For example, "part scrapped because OD is ULL." See also OHL. UNC Unified National Extra Fine A subset series of the Unifi Unified National "J" series Coarse A subset series of the Unified Thread Standard, with controlled root radius and increased minor diameter. For applications requiring maximum fatigue resistance amid chronic vibration (such as in aircraft). UNJF Unified National "J" series Fine A subset series of the Unified Thread Standard, with controlled root radius and increased minor diameter. For applications requiring maximum fatigue resistance amid chronic vibration, spell out. UNS Unified National Special; unified numbering system Unified National Special is a subset series of the Unified Thread Standard. It is an extensible series, covering various special threads. The unified numbering system is a vaguely named standard for naming alloys by principal element percentages. UON unless otherwise specified A fairly wellknown abbreviation, but to avoid confusion, spell out. USASI United States of America Standard; United States of America Thread Standard. As for U.S. Steel, it was once the largest steel company on earth, often an approved supplier, and not infrequently a sole source; hence its mention on drawings. UTS ultimate tensile strength; Unified Thread Standard V v finish A letter v (Latin small letter v) written on a line representing a surface is a way to indicate that the surface is to be machined rather than left in the as-cast or as-forged state. The older symbol for this was a small script (italic) f (see herein f). 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. W WC tungsten carbide The "W" comes from the element symbol for tungsten, W, which comes from the element symbol for tungsten, W, which comes from the element symbol for tungsten, W, which comes from the element symbol for tungsten, W, which comes from the element symbol for tungsten, W, which comes from the element symbol for tungsten, W, which comes from the element symbol for tungsten, W, which comes from the element symbol for tungsten, W, which comes from the element symbol for tungsten and the elemen mentioned at all in modern drawings. W/I, w/i within A little-used abbreviation. Better to spell out for clarity. X X used to indicate the word "by" When the letter X is preceded by a space, this means "by". For example, a chamfer may be called out as 12 X 45° X[2] or () number of places—for example, 8X or (8) When a dimension is used in multiple places either of these prefixes can be added to the dimension to define how many times this dimension is used. This example signifies eight places. There should be no whitespace between the numeral and the letter X. (Note on character encoding: Although in typography (including Unicode) the letter X. and the multiplication sign (x) are distinct characters with differing glyphs, it is a longstanding tradition in engineering drawing that the letter X is interchangeable with the multi sign, unless otherwise specified by the CAx systems used.) Y Y14.X — Calls out the drawing standard that this drawing is following. For example, ASME Y14.5 and Y14.100 are commonly used standards that define all of the symbols and drafting conventions used. YS yield strength Z Jump to: 0-9 • A • B • C • D • E • F • G • H • I • J • K • L • M • N • O • P • Q • R • S • T • U • V • W • X • Y • Z • see also See also List of geometric dimensioning and tolerancing symbols References ^ ASME 2007. ^ a b c d e f g h i Sheaffer, M. K.; Thomas, G. R.; Dann, R. K.; Russell, E. W. (May 1998), Engineering Drawings for 10 CFR Part 71 Package Approvals (PDF), pp. 11-12, retrieved 2011-06-25. ASME Y14.5-2009. NY: American Society of Mechanical Engineers. 2009. pp. 16, 17; paragraph 1.8.10. ISBN 0-7918-3192-2. ^ Dimensioning and Tolerancing, ASME Y14.5-2009. NY: American Society of Mechanical Engineers. 2009. pp. 16; paragraph 1.8.10. ISBN 0-7918-3192-2. Bibliography Sources cited ASME (1997), Y14.35M-1997: Revision of engineering drawings and associated documents, ASME, archived from the original on 2013-04-14. ASME (2007), Y14.38-2007: Abbreviations and acronyms for use on drawings and related documents, ASME. French, Thomas E.; Vierck, Charles J.; et al. (1953), A manual of engineering drawing for students and draftsmen (8th ed.), New York, New York, USA: McGraw-Hill, LCCN 52013455. Throughout, but especially pp. 689-690, appendix list of abbreviations and symbols.CS1 maint: postscript (link) Further reading Y14.30-2004 Engineering drawings Y14.31-2008 Undimensioned drawings Y14.36M-1996 Surface texture symbols Y14.38-2007 Abbreviations and acronyms for use on drawing Y14.41-2003 Digital approval systems Y14.42-2002 Digital approval systems Y14.42-2009 Dimensioning and tolerancing Y14.5.1M-1994 Mathematical definition of dimensioning and tolerancing Y14.5.1M-1994 Mathematical definition of dimensioning and tolerancing Y14.40-2003 Digital approval systems Y14.5-2009 Dimensioning and tolerancing Y14.5.1M-1994 Mathematical definition of dimensioning and tolerancing Y14.5.1M-1994 Mathematical definition of dimensioning Algorithms and Acronyms for use on drawing Y14.5.1M-1994 Mathematical definition of dimensioning Algorithms and Acronyms for use on drawing Y14.5.1M-1994 Mathematical definition of dimensioning Algorithms and Acronyms for use on drawing Y14.5.1M-1994 Mathematical definition of dimensioning Algorithms and Acronyms for use on drawing Y14.5.1M-1994 Mathematical definition of dimensioning Algorithms and Acronyms for use on drawing Y14.5.1M-1994 Mathematical definition of dimensioning Algorithms and Acronyms for use of the Algorithms and tolerancing principles Y14.6-2001 Screw thread representation Y32.7-1972 Graphics symbols for railroad maps and profiles "Engineering Materials Abbreviations and Acronyms". www.matweb.com. 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