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Ntn roller bearing catalogue pdf

1. Ball and roller door for New Technology Network R corporations CAT. NO. 2202 - (E 2. Technical Data A- 5 Deep Groove Ball Beast B-5 Miniature with extra carrying B-31 angular contact ball B-43 self-lined carrying ball B-65 cylinder B-25 cylinder b- Type Roller Bearing B-119 Thrust Location carrying B-255 Lockwashers, lockwashers > Lockplates C-1 Catalog List & Appendix Table D-13. Warranty NTN warranty, in the original purchase only, that the release product that is subject to this sale (a) will conform to drawings and specifications mutually established in writing as applicable to the contract, and (b) be free of damage to material or fabric. The duration of this warranty is one year from the date of delivery. If the purchase is discovered in this period a failure of the compliant product to drawings or specifications, or a defect of material or fabric, it must promptly notify the NTN in writing. 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Technical dataA-100 17.1 Deep groove carries radial clearances and axial internal clearancesA-100 17.2 Angular contact ball bearing axis load with acquisal considerationsA-100 17.3 Taped Roller Bearing Load AxleA-102 17.4 Allow acceleration charge to bring A-10 to 217.5 Fitting surface pressureA-103 17.6 Necessary press fit and force pen A-104 7. • Classification and features of Rolling Carry 1.1 Rolling Where To Bring Construction Most Rolling consists of rings and raceways (internal rings and outward rings), rolling elements (either balls or rolls) and cages. The cage separates the rolling elements at regular intervals, keeps them in place in the interior and reassured outward, and allows them to vote freely. Raceway (inner ring and external ring) or wash reassured 1) The Surface on which Roll Elements are called the reassured surface. The load placed on the door is supported by this contact surface. Usually ring in interior rings along the axle or shawl with the outward ring on the housing. Note 1: The bearing dust root is called washed root, the inner ring is called wash at shaft root and the outward ring is called washing racing the roof. Rolling Element Rolling elements classify into two types: ball and roller. Rolls come in four types: cylindrical, needle, typing, and spherical. Geometrically contact balls and surfaces are reassured to the interior and ring outside of point, while the contact surface of rolls is a contact line. Theoretically, rolled doors are so constructed as they allow the rolling component of Naturally Orbital while also rotating on their own axle at the same time. Cage functions to keep components rolling in a uniform pitch so load never applies directly to the cage and to prevent the rolling components falls when touching the door. The types of cages differ according to the way they are manufactured, and include pressed, machine and formed cages. 1.2 The roller bearing roller classification is divided into two main classifications: ball doors and roller doors. Bring the balls rank according to their ring setup: type groove deep and angular contact type. Roller bearing on the other hand are sorted according to the shape of the roller: cylindrical, needle, typed and spherical. Rolling thresholds can be further classified according to the directives in which the charge is applied; bear radial burdens bearing radial burdens and pushing bear axial loads. Other classification methods include: 1) the number of rolling rows (single, double, or 4-row), 2) separable and non-separable, in which either the inner ring or the outward ring can be detached. There are also carries designed for special applications, such as: railroad trip roller bearing, screw balloon support, screw door, as well as linear linear doors (linear balls, linear roller bearing and linear roller bearing). Types of rolled bears are provided in Figure 1.2. A-5 Outward Ring Inner Cage Ball Deep Groove Ball Carrying One Ring Outdoor Ring Angular Side Bearing Fig.B Inner Ring Outward Roller cylindrical Roller Cylindrical Roller Bearing Fig. C Outer Ring Roller Cage Needle Roller Bearing Fig. D External Cage Roller Inside Roller Taped Roller Bearing Fig. E Outer Ring Inner Ring Roller Cage Spherical Roller Bearing Fig.F Shaft Reassured Wash racing Laundry House Washing Ball Cage Ball Bearing Fig. G. Roller Shaft Reassured Washing Cleanser Cage Thrust Roller Bearing Fig. H.1.1 Rolling Carries 1. Classifications and features of rolling carry 8. • Classification and the Rolling feature bring A-6 High speed duplex angular bearing (for load axle) * Ball Bearing Roll Unit * Rolling Bear Ball Carrying Roller Ball Radial Ball Thrust Bearing Roller Coatal Roller Roller Carry Single Range Deep Ball Groove Carry Single Range Angular Contact Bearing Double Range Angular Contact Ball Contact Ball Carry Balls Auto-Lined Bearing Balls Single Direction Push Brings Double Direction Angular Contact Balls Where balls * Single range cylinder roller carrying Dual cylinder roller range carrying Needle Roller * Single range roller battery carrying Dual roller range carrying spherical roller bearing cylinder dust bearing * Needle push roller bearing * Spherical Roller Bearing ... B-5 ... B-43 ... B-46 ... B-60 ... B-255... B-65 ... B-102... B-119... B-262... B-219... B-77 B-58 Fig. 1.2 The rolling classification carries 9. • Classifications and features of bringing rolling A-7 Mens Type Ball Bearing * Special Application Carrying Clearance Adjust Needle Roller Needle * Complex Carry * Balloon Speed Support Carry * Connectors Roller Blinds and Cage *Followers Roller* Cam Followers* Railway Car Roller Roller Blinds Vacuum Ultra-Clean Carrying * Linear Motion Carrying Linear Ball *Linear Roller Bearing* Linear Roller Roller Must * Isolate Where To Carry MEGAOHMTMT Series * Rubber Moderate Carry * SL-Type Roller * Note : Carries that are marked with an asterisk they don't have in this catalog. For details, see the catalog devoted to the con type of bear. 10. • Classification and rolling features of bringing A-8 1.3 the rolling feature brings 1.3.1 features of rolling bearing to come in many shapes and varieties, each with its own distinct features. However, when compared to sliding doors, the doors roll all have the following advantages: (1) The coefficient of friction starts lower and there is little difference between this and the coefficient of dynamic friction. (2) They are internationally standard, interchangeable and easy to find. (3) They are easy to fat and consume less lubricants. (4) As a general rule, one place carries both radial load and axle at the same time. (6) You can improve rigidity by preloading. Construction, grade, and special features of rolling doors are fully described in the boundary dimensions and bring numbering systems section. 1.3.2 Ball bearing and roller brings Table 1.1 to provide a comparison of bearing balls and carrying roller. Table 1.2 Configuration of bearing ball seal 1.3.3 Radial with thrust carries almost all kinds of rolling carrying both radial loads and axis at the same time. Generally, carrying with a contact angle of less than 45° has a greater radial load capacity and is classified as radial bearing; whereas bearing has a contact angle on 45° has a greater axle load capacity and is classified as bearing dust. There are also carries classified as complex carries that combine the loading features of both carry radial and dust. 1.3.4 Standard brings and carries the special boundary dimensions and the form brings to adhere to the international interjerishable standards and can get easy and economically on the world. It is therefore better design mechanical equipment to use bearing standards. However, depending on the type of machine to be used in, and the expected application and function, a non-standard or specifically designed bearing case is best to use. Brings that to adapt to specific applications, and carrying units that are integrated (built-in) into a car's component, and other doors that are specifically designed are also available. Typical standard bearings features are as follows: Table 1.1 in bear ball and roller bearing ball bearing 2a 2b 2b Point contact surface contact oval when load applies. Surface Contact Linear Contact is generally rectangular when charges apply. Because of linear contact, rotational torch is higher for carrying roller than to carry bumps, but rigidity is also higher. Load capacity is higher for rolling carry. Cylindrical roller bear equipped with a mouth can bear the load of radial waist. Combining roller tan bearing in pairs allows doors to carry an axle load in both directions. Load capacity is lower to carry bumps, but carrying radials are capable of carrying loads in both the radial and accial direction. Contact reassured characteristsLoadcapacity because of point contact has little rolling resistance, ball doors are suitable for low tortor and high speed of application. They also have superior acaly features. Deep balls that carry the most common type of bearing, deep bearing balls are widely used in a variety of fields. Deep bearing balls include shield and carrying seals and fat to make them easier to use. Deep-bearing balls also include doors and a spotted bare-ring facilitate positioning when mounting the outer ring, bearing compensation expansion that absorbs the dimensional dimensions of the supply surface carried due to housing temperature, and TAB bearing capable of keeping upside and contamination of the lubrication oil. Shield Seal non-contact ZZ non-contact LLB LOW TORQUE LLH contact LLU Type and Symbol Configuration 11. • The classification and feature of Rolling bearings A-9 angular contacts carry the line that unites points of contact to the inner ring, ball and exterior running at a certain angle (contact angle) towards the radial. Carrying them is generally designed with three contact angles. Angular contact balls can support an axle load, but can't be used by a single bearing spot because of the contact angle. They must instead be used in pairs or in combinations. Angular contact balls include double range carrying angular balls for which the interior and outside rings are combined as a single unit. The contact angle of double range angular contact ball bearing is 25°. There are also carrying contact four points that can support an axle load in both directions by themselves. These carries however require precautions because issues like too much temperature increase and wear can occur depending on the load conditions. Table 1.6 Type cylinder roller bearing cylinder roller carrying Users Use roller for rolling elements, and therefore has a high load capacity. The rolls will be guided by the ribbon of the inner ring or outward. The interior and outdoor ring can separate assembly facilities, and both can fit with shambles or tight roof. If there is no ribbon, either the interior or the outward ring can move freely in the acquisal direction. Roller cylinder therefore ideals must be used as so-called free locations that absorb absorb expansion. In the case where there is a rib, where they carry a load of small height axle between the ends of the rolls and ribs. Cylindrical roller bearing includes the type HT that modified the end roller end shape and rib to increase the road's axial capacity. And the type E and an internal special design to improve radial load capacity. Type E is standard for small-diameter sizes. Table 1.6 shows the basic configuration of carrying cylinder roller. In addition to these, there are roller roller bearing with multiple rows of roller and the SL type of roller complement carries without cage. NUP type NTFS type NJ type NJ type NUP type NUP type NH(NJ+H) NJ Type NTFS Type Type and Cartoon Symbols Table 1.4 Configuration of dual range angular contact bearing Table 1.5 Combination of duplex angular ball bearing Table 1.3 Contact angle and contact angle °C 30°C 40°B Contact angle and contact angle symbol 1) Note 1: Contact an abbreviated angle symbol as A. Open Shield Z Contact sealed LLD non contact sealed TYPE LLM and Symbol Configuration r r Return-to-duplex DBdem Tandem duplex DT face-to-face duplex DF Type and symbol Configuration 12. The -10 • Classification and feature of the Rolling Bearings Taped Roller Taped bearing roller are designed for inner roller / outer ring race and apex of roller roller's intersecting at one point on the bear center. By getting combined charge from interior and exterior rings, the rolls are pushed against the inner ring ribs and guided with ribs. Force-induced air-generated power towards axle when a radial load is applied, so they must be handled using a pair of bearing. Rings of interior and roller with exterior rings come apart, thereby facilitating riding and klearans or preload. Gathering clearance is however difficult to manage and demand special attention. Their typed roller supports can support large loads in both their direction and radial. NTN locations that have 4T-, ET-, T- and U attached and conform the ISO name with JUST standards for sub-unit dimensions (nominal contact angles, nominal end diameter of outer rings) and are internationally interchangeable. NTN also has a line in difficult cases carrying steel designed for longer lives (ETA,ET+, etc.). NTN typed roller bearing also includes carry and two with four rows of roller typing for extra-heavy loads. Figure 1.3 Tepered roller bearing E2a sub-unit dimensions E: nominal end small diameter of external rings α : Nominally contact Table angle 1.7 Spherical Roller Type bring Table 1.8 Type push bring spherical roller equipped with an outer ring with a spherical race surface and an interior ring that holds two rows of barrel-shaped rolled elements, NTN spherical roller bearing can be adjusted the alignment for occupying the inclination of the axle or shade. There are varieties of bearing types that are different according to their internal design. Spherical bearing is included as kind of equipped with an interior ring and a typed harassing. Carrying can easily be mounted on a shaft by means of an adapter sleeve or withdrawal. The bear is capable of supporting heavy burdens, and therefore often used in industrial machines. When heavy accial load is applied to the door, the load on rolls in another row disappears, and can cause problems. Attention must therefore be paid in operating conditions. Push carrying Quality Standard (B type) C type E213 type Configuration GS/WS type wash type as washing roller type AXK type alignment angle type dust roll carrying rolls push carrying cylinder roller bearing sferical dust roller bearing Configuration Have many types of pushes bring different types of components according to the shape of rolling components and applications. Enabling rotational speed is generally low and special attention must be paid to lubrication. In addition to the provided below, there are various bearing pushes for special applications. For details, see the catalog devoted to the con type of bear. 13. A-11 • Classification and feature of Rolling Door Table 1.9 Main Type of Roller Needle Roller Carrying Unit Carrying Unit Needle Roller Neede As Needle Roller Component. The needle roller are a maximum of 5 mm in diameter and are 3 10 times as long as they are in diameter. Because bearing uses needle rolls as rolling elements, the cross-section is thin, but they have a high load capacity for their size. Because of large numbers of rolling elements, doors have high frige and are prioritized abusive or pivot movement. There's a merger of the kind of needle bear roller, and just a few of the most representative qualities are covered here. For details, see the catalog devoted to the con type of bear. A unit composed of a ball set in various housing types. The housing can be bolted on cars and the interior ring can be easily mounted along the shaft with a screw set. This means the carrying unit can support voting equipment without special design to allow for ride. A variety of standard housing forms are available, including pillows and standard types. The diameter outside of the door is spherical just like the inner diameter of the housing, so it can align itself on the shamp. For lubrication, fat is sealed inside the door, with particle generation prevented by a double seal. For details, see the catalog devoted to the con type of bear. Roller Type Roller Bearing with Cage Type Needle Roller Side bearing Roller Type Needle Roller Follower Cam Follower Setup Fat Fimting Housing Slinger Exterior Slinger Tire Special and Ball Fig. 1.4 Oil-lubricated bearing unit 14. Selefaringtypeandconfiguration (1) Limitation Dimension space permit for carrying is generally limited. In most cases, shaft diameter (or the diameter carries) is determined according to the car's other design specifications. Therefore, the bearing type and dimension are determined according to carrying diameter of teaser. For this reason all dimension tables are organized according to standard table diameter. There are a wide range of bearing types and dimensions: The right one for a particular application can usually be found in the following tables. (2) Carrying these characteristics, magnitude, and direction of the burdens they act on a variable carry are very variable. In general, basic load evaluation is shown in Carry Dimension tables indicates their load capacity. However, to determine the appropriate appropriate type, consideration must also be given if the acting burden is a radial load only or combines radial and accented charges, etc. When the ball and carry roller in the same dimensional range are considered, the roller bearings have a bigger load capacity and are also able to withered excessive hum and shock charges. (3) The speed rotational speed allowed in a location will be different depending on carrying type, size, tolerance, cage type, load, lubrication condition, and cooling conditions. Speeds are allowed listed in tables brought for fat and oil lubrication are for normal NTN tolerance. In general, carrying deep groove balls, carrying angular ball contact, and roller are more suitable for high-speed applications. (4) Bringing precision tolerance to the dimensions and tolerance operated in carrying them ruled by ISO and LEGAL principles. For equipment that requires high runout runout runout tolerance or high-speed operations, where carrying and tolerance class 5 or higher is recommended. Deep bearing balls, carrying angular ball contact, and carrying cylinder roller are recommended for rotational tolerance. (5) Rigid elastic deformity occurs on the contact surfaces of a place's rolling component and the reassured surfaces are under loading. With certain types of equipment it is necessary to reduce this deformity as much as 2%. Location carrying component roller selection brings them available in a variety of types, configurations, and sizes. When choosing the correct for your application, it is important to consider several factors, and analyze in various means. A comparison of the performance features for each bear type is shown in Table 2.1. As a general guide, the basic procedure for choosing the most appropriate location is shown in the following flow chart. A-12 •Bearing Selection 2.1 Where to bring color selection • Shaft runout tolerance (refers to page insert... A-35) • Rotational speed (see page insert... A-70) • Fluctuation • Design life elements at home (see in insert... A-19) • Dynamik / static equivalent conditions (see page insert... A-25) • Safety factor (see page insert... A-70) • Allowable speed (see page insert... A-19, 25) • Allowable accid load (see page insert... A-70) • Allowable space (see page insert... A-30) • They (see page insert... A-30) • Bearing load (magnitude, direction, hum; presence of shock charge) (see page insert... A-21) • Rotational speed (see page insert... A-70) • Bearing tolerance (see page insert... A-35) • Rigid (see page insert... A-67) • Allowable misalignment of inner / outer rings (see page insert... A-87) • Torch friction (see page insert... A-71) • Bearing accommodation (fixed side, floating side) (see page insert... A-15) • Installation and disaster requirement (see page insert... A-88) • Availability and cost • Function and construction of the house element bring • Bearing where • Bearing load (direction and magnitude) • Ro speed • Vibration and shock charges • Bearing temperatures (Ambient temperatures / rising temperatures) • Operating environment (potential for corrosion, Degree of Contamination, Lubrication Facility) Confirm operating conditions and operating settings Choose the type where to bring and configure Select Dimensions Choosing which brings tolerance Proceedings 15. • Bearing Selection A-13 Fig. 2.1 is possible. Roller bearing display less elastic distortion than bear bumps. In addition, in some cases, the carries are given an advance charge (preloaded) to increase their rigidity. This procedure is often applied to carry deep groove balls, carry contact angular balls, and quick carry roller. (6) Misalignment of interior with Shaft's flexible exterior ring, variation of shaft or housing accuracy, and fixed errors. result in a certain degree of misalignment between the carrying's interior and outward rings. In cases where the degree of misalignment is relatively large, self-aligned bearing, carrying spherical, or carrying units with self-aligned properties are the most appropriate choice. (See Figure 2.1) (7) Noise and bearing torque levels are manufactured and processed according to high accuracy standards, and therefore generally produces only a little amount of noise and torque. For applications that require particularly low-noise or low-torque operations, carrying deep groove balls and cylindrical doors are more suitable. (8) Facilities and disaster applications require disaster and reassurance to allow periodic inspections and repairs. For these applications, carry with separable/ outdoor interior rings, such as carrying cylinder roller, needle doors, and roller rings that prevent them most suitable. Incorporation of handle adapter simplifies the installation and disaster of self-lined ball doors with spherical roller bearing and bothering typing. • Materials and shamp shape and housing paj insert ... A-85) •Fit (al gade nan paj insert ... A-49) •Temperature diferansyel ant bag enterey / eksterye (al gade nan paj insert ... A-59) •Allowable misalignment nan bag enterey / eksterye (al gade nan paj insert ... A-87) •Load (mayitude, nati) (al gade nan paj insert ... A-21) •Amount nan preload (refere a paj insert ... A-66) •Rotational vites (al gade nan paj insert ... A-70) •Rotational vites (al gade nan paj insert ... A-70) •Noise nivo •Vibration ak chaj chok •Momentary •Lubrication kalite ak metod (refere a paj insert ... A-72) •Operating tanperat (al gade nan paj insert ... A-72) •tasyonel vites (al gade nan paj insert ... A-70) •Lubrication kalite ak metod (al gade nan paj insert ... A-72) •Sealing metod (al gade nan paj insert ... A-80) •Mainans an ekspekysyon (al gade nan paj insert ... A-94) •Operating anivwonman (tanperat ki ba / ba, yakom, pharmaceutical, elatriye) •Kondisyon pou fyab segonde (al gade nan paj ... A-86) •Installation ak pwoesedi (al gade nan paj insert ... A-88) Chwazi clearance enten la Chwazi kalite kaj ak materyel Chwazi lubricant, metod lubrification, sele metod Chwazi nenpot espesyal kote yo pote espesifikasiyon konfine pwosed manyen pwop tet ou-alien boul kote yo pote Ppherical roulo pote Pemet pemal misalignment 16. A-14 •Bearing Table Seleksyon 2.1 Kalite pot woule ak komparezon pemfans kote yo pote Kalite Deep groove pote boul angile Duplex angile kontak pote boul oto- alien boul silendrik roulo pote Doub woule ranje silendrik pote Zegwi woule pote karakteristik ★★★★★ ★★★★★ ★★★★★ ★★★★★ ★★★★★ @ ○ ★★★★★ ★★★★★ ★★★★★ @ ○ ★★★★★ ★★★★★ ★★★★★ @ ○ ★★★★★ ★★★★★ ★★★★★ @ ○ B-B 5 B-43 B-60 B-43 B-65 B-77 B-77 B-102 ★★★★★ ★★★★★ ★★★★★ @ ○ B-119 ★★★★★ ★★★★★ @ ○ B-219 ★★★★★ ★★★★★ @ ○ B-255 1 Load Carrying Capacity Radial load Axial load High speed High rotating accuracy Low noise/vibration Low friction torque High rigidity 1 1 1 1 Vibration/shock resistance 1 Allowable misalignment for inner/outer rings 1 Stationary in axial direction 2 Moveable in axial direction 3 Separable inner/outer rings 4 Inner ring tapered bore 5 Remarks Reference page For duplex arrangement For DB and DF arrangement NU, N type NU, NN, N type NJ, NF, NP, NH type Tapered roller bearings Double-row, 4-row tapered roller bearings Spherical roller bearings Thrust ball bearings Cylindrical roller thrust bearings Spherical roller thrust bearings Reference page Bearing types Characteristics 1 High speed High rotating accuracy Low noise/vibration Low friction torque High rigidity 1 1 1 1 Vibration/shock 1 Enable misalignment for inner ring / outward 1 Stationary towards Accented 2 Move towards axis 3 Separable innate / outside ring 4 Inner rings typing 5 Note 1 Reference Page Load Bearing Capacity Radial Load Axial load for duplex arrangement 1 ★ The number of stars indicates the degree where to carry showing that particular feature. ★ not applicable to that type of bearing. 2 @ Indicate double direction. ○ Indicate one direction movement only. 3 @ Indicate movement towards the possible axle for the reassured surface; ○ Indicate movement towards the axle is possible for the film surface of the outer ring or internal ring. 4 ○ Indicate both inner rings and outer rings are detached. 5 ○ Indicate appropriate interior sounds and harassing is possible. THE -70 A-35 — A-71 A-58 A-21 A-85 A-15 — Put needle push rolls bearing — 2.2 Types and Table features 2.1 display types and features of rolling doors. 17. • Bearing Selection A-15 2.3 Selection of Shafts accommodation or axle are generally supported by a pair of bearing in the axle and radial directions. The bearing is preventing the acqiuial movement of the housing shamp house called fixed side by side and the gate allowing relatively acqiuial movements called floating-side locations. This allows for expansion and contraction in the shaft due to temperature variation and allow errors in carrying ride clearance to be absorbed. The fixed carry location is able to support radial loads and accial loads. A bear that can fix accid movements in both directions should therefore be chosen. A floating-side location that allows movement towards the acqiuial while supporting a radial load is desirable. Movement towards the axle is designed on the racer surface to carry with separable inner rings and outward rings like cylindric roll doors, and reach on the fitting surface for non-separable ones, such as deep ball bearing. In applications with short distance between bearing, expansion of shamp and contraction due to temperature fluctuation is slightly off, therefore the same type of bearing can be used for both fixed side and floating sides. In these cases it is common to use a set of matching bearing, such as carrying angular contact balls, guides and supporting the shamp in one direction axle only. Table 2.2(1) displays typical arrangements where types carry differently on fixed side and floating side. Vertical arrangement to bring where there is no distinction is made between fixed side and floating side. Arrangements in Table 2.2(3). 1. General accommodation for small cars. 2. For radial loads, but will also accept accept loads. 1. Suitable when mount error and deflection shaft are scarce or used for rotational speed applications. 2. Even with expansion or twinge of shamps, side floating Pain. 1. Radial loading with double direction in accial loading is possible. 2. In place of duplex angular contact bearing, bringing double-range angular contacts are also used. 1. Heavy loading can. 2. Shafting's rigidity increased by preloading two back-to-back carries fixed. 3. Requires high precision sharing and housing, and minimum equipment error. 2. Using an adapter on long shaft without screws or shoulders, bringing inline and dismounted can ease. 3. Self-aligned threshold has been used for presiding over axle load. 1. Widely used in general industrial vehicles and heavy and shock charge demands. 2. Allow for shaft reflection and equipment error. 3. Accept radial loads as well as double direction of loads axle. 1. Accept radial loads as well as double direction loads. 2. Suitable when both interior and exterior rings require to fit tightly. 1. Capable of handling large radial and accid loads of rotational speeds. 2. Keep clearly between the outdoor bearing diameter and the housing interior diameter to prevent deep bearing balls from receiving radial charges. Arrangement Fixed Floating Comment Application (Reference) Gear veteran gear for small pumps, auto-mobile transmission, etc. Medium-sized electric motors, salesman, etc. Reduction Gear for general industrial vehicles General Industrial Gear Reduction general industrial gear for industrial machine reductions for general industrial transmission district vehicles for diesel locomotives Table 2.2(1) Where to bring accommodation (distinction between fixed and floating-side) 18. • Bearing selection A-16 1. General accommodation for use in small cars. 2. Preload is sometimes applied by placing a spring on the external side surface or wearing a shit. (can float ground) 1. The arrangement return is preferable to design arrangements when charge moments apply. 2. Comp support axial and radial load suitable for high speed rotation. 3. Shaft's rigidity is enhanced by giving preload.

but ensuring preload is not extensive. 3. Return-to-arrangement moment, and face-to-face arrangement to relieve error fixing equipment. 4. With face-to-face arrangement, fit inner ring tight ease. 1. Capable of supporting extra heavy loads and impact loads. 2. Suitable if interior and fit tight exterior ring required. 3. Care must be taken clearly that this accident does not become too small during the operation. 1. When Range Bearing is a contact ball duplex angular where the bear, floating should a cylindrically bearing roller. 1. Most suitable arrangements for very heavy access loads. 2. Change deflection and up errors can be absorbed by matching the center of the spherical surface with the center of the push push. The back return of the Face Comment arrangement Application (Benchmark) Gear Reduction, front and rear axle of automotive, etc. Construction equipment, waste mining equipment, injure, etc. Machine tool spindles, etc. Application Comment arrangement (References) Center shamb, etc. Vertical mounted electric motor, etc. Table 2.2(2) Bring arrangement (no distinction between fixed and floating-side) Table 2.2(3) Bring Arrangement (Vertical Shaft) 19. 3. Load rating and lifetime 3.1 Bearing lives even in bearing operate under normal conditions, the surfaces of the root and rolling components are constantly suggesting repeated compressive stress causing flasks to the surface to occur. This flaking is due to material fatigue and will eventually cause doors to fail. The effective life of a place to bring is usually defined in terms of the total number of revolution a can undergo before you flacking to either the racer surface or the rolling element surfaces occur. Other causes of bear failure are often attributed to problems such as marvel, abrasion, split, chipping, scuffing, rusted, etc. However, so-called causes of bear failure are usually themselves caused by improved installation, insufficient or malicious lubrication, doom selection or incorrect bear selection. Since the above mentioned causes of carrying failure can be avoided by taking the proper precautions, and not simply caused by material fatigue, are regarded as separately in the flaky aspect. 3.2 Basic Life rating and basic charge rating A group of carries that you lose identical when subject to identical charges and operating conditions will expose a wide diversity of their resistance. This lifetime disparity can be accounted for by the difference in the fatigue of the bear material itself. This disparity is considered statistical when calculated brings to life, and the basic rating life is defined as follows. The basic rating lifetime is based on a 90% statistical model that is expressed as the total number of revolutions 90% of the threshold of an identical group of carrying subject to identical operating conditions will be tagged or airspace before flaking due to material fatigue occurs. For carrying operating at constant fixed speed, the basic rating lifetime (90% reliability) is expressed in total number of hours of operation. Basic load dynamic rating express capabilities a roller carry supports a dynamic load. Rating of basic dynamic charge is the load under which the basic rating life of the bear is 1 million revolution. This is expressed as load of radial load to carry radial and load more axial to carry them. These are referred to as basic rating dynamic load (cr) and basic dynamic dynamic load rating (Ca). The basic dynamic load assessment provided in tables to bring to this catalog are for carrying constructed in standard carrying materials, using standard manufacturing techniques. The relationship between the basic rating lifetime, rating of dynamic dynamic load and the load bearing is provided by formulas. To carry bumps: $L_{10} = (C)3 \dots$ (3.1) P For wheel bearing: $L_{10} = (C)10/3 \dots$ (3.2) P Location, L10: Basic Life Rating 106 Revolution C: Basic Dynamic Load Rating, N{kgf} (Cr: Radial Door, Ca: push carry) P: Equivalent load dynamic, N{kgf} (Pr: radial bearing, Not: dust bearing) n : Rotational Speed, min-1 the relationship between our rotational speed and fn speed factor as well as the relationship between the L10h rating life and the life factor shown in Table 3.1 and Fig 3.1. A-17 • Load Rating and Life 40,000 4.6 60,000 80,000 30,000 20,000 15,000 3 10,000 2.5 8,000 6,000 4,000 3,000 2,000 1.9 3.5 4.5 2 4 1.8 1.7 1.6 1.5 1.41,500 1.3 1.2 1,000 1.1 900 800 700 600 500 400 0.95 1.0 0.90 300 0.85 0.80 0.76200 100 0.6 60,000 40,000 0.106 30,000 0.12 0.14 20,000 0.1615,000 0.1810,000 0.20 8,000 0.22 0.24 0.26 0.28 6,000 4,000 3,000 2,000 0.30 1,500 0.35 1,000 0.4 800 600 0.5 400 300 200 150 0.7 80 60 0.8 0.9 40 30 1.0 1.1 1.3 20 15 1.4 1.2 1.4410 60,000 5.480,000 4.5 5 40,000 4 30,000 3.5 20,000 15,000 3 2.5 10,000 6,000 24,000 3,000 2,000 1.9 1.8 1.7 1.6 1.5 1,500 1.4 1.3 1.2 1,000 800 900 700 1.1 1.0 600 500 400 0.95 0.90 0.85300 0.80 0.75 0.74 2001.4910 40,000 60,000 30,000 0.10 0.082 0.09 0.12 0.14 20,000 15,000 0.16 0.18 10,000 8,000 8,000 6,000 4,000 3,000 2,000 1,500 1,000 800 600 400 300 200 150 0.20 0.22 0.24 0.26 0.28 0.30 0.35 0.4 0.5 0.6 0.7 0.8 100 80 60 40 30 20 0.9 1.0 1.1 1.2 1.3 1.4 15 ffn L10h min-1 h fh nou L10hfn min-1 h fh Ball bearings Roller bearings Fig. 3.1 Bearing life rating scale Classification Ball bearing Roller bearing Basic rating life L10h h Life factor fh Speed factor fn 60n 106 ()P C ()n 33.3 fn P C fn P C = 500 fh 3 60n 106 ()P C = 500 fh 10/3 10/3 1/3 ()n 33.3 3/10 3 Table 3.1 Correlation of bearing basic rating life, life factor, and speed factor 20. When multiple locations are incorporated into cars or equipment as complete units, all the doors in the unit are considered a whole when bringing to life (see Formula 3.3). 1 L = (1+1+... 1) 1/e... (3.3) L1 and L2 e LN and location, L: Total life rating of all units, h L1, L2... Ln: Basic Life Rating of Carrying People, 1, 2, ... n, h = 10 / 9 To carry ball e = 9/8... Lm = ($\Phi_1 + \Phi_2 + \dots + \Phi_j - 1$)... (3.4) L1 L2 Lj Location, Lm: Total lifetime of carrying Φ_j : Frequency of individual load conditions ($\sum \Phi_j = 1$) Lj: Life under individual conditions If equivalent P and our rotation speed are operating conditions at the door, basic rated load dynamic C that meets the necessary life of the threshold determined using Table 3.1 and formula (3.5). Bear that meets C's needed C's must be selected in the bring dimension table provided in the catalog. fh C = P —... (3.5) fn 3.3 adjusts the Basic Life Rating brings life (90% reliability factor) can be calculated in the formulas mentioned earlier in Section 3.2. However, in some applications a bear life factor of more than 90% reliability may be required. To meet these requirements, carrying life can length not be used to specifically improve material or manufacturing processes. Bringing life is also sometimes affected by operating conditions such as lubrication, temperature and rotational speed. Basic adjusted life rating are compensate for this named Adjust Life Rating, and it is determined using formula (3.6). Lna = a1 • a2 • a3 • L10 ... (3.6) Location, Lna: Adjusted Life Rating in Millions of Revolution (106) a1: Factor Reliability a2: Bringing factor features to3 : Operating condition factor 3.3.1 Reliability factor a1 The value of reliability factors to1 is given in Table 3.2 for reliability of 90% or greater. 3.2 Bring factor features a2 Bring features regarding varying lives according to material, quality of material and if using special manufacturing processes. In this case, life adjusts using brings a2 factor features. The basic dynamic load evaluations listed in the catalog are based on NTN's standard material and processing, therefore, the adjustment factor a2 = 1. a2 > 1 can be used for specifically increased material and manufacturing methods. If this is applied, consult with NTN engineering. Dimension changes significantly if bringing in high chrome carbon carries steel and conventional heat treatments are used in temperatures in excess of 120°C for a prolonged period of time. NTN Engineering therefore offers a bearing for high-temperature applications specifically treated to stabilized dimensions of the maximum operating temperature (TS treatment). The treatment however makes the softer softer and affects life at the door. Lifetime adjusted by multiply by the given value in Table 3.3. 3.3.3 Condition Operating factor a3 Condition Operating factor a3 is used to offence for when libritation conditions become worse due to increases in temperature or rotation speed, deteriorated lubricant, or become contaminated with foreign problems. Generally speaking, when lubrication conditions are satisfactory, the a3 factor has a value of one; and when lubrication conditions are exceptionally favorable, and all other operating conditions are normal, a3 can have a value greater than one. a3 is however less than 1 in these cases: A-18 • Load Rating and Reliability Life Ln Reliability Factor's 190 95 96 97 98 99 L10 L5 L4 L3 L2 L 1.00 0.62 0.53 0.44 0.33 0 21 Table 3.2 Reliability factor a1 max symbol. operating temperature (C°) Where to bring factor characteristics a2 TS3 TS3 4 200 250 0.73 0.48 TS2 160 1.00 Table 3.3 Treatment for stabilizing 21 dimensions. ;Dynamik viscosity oil lubricification too low for operating temperature (13 mm to 2/s or less to carry balls, 20 mm 2/s to carry roller) ;Rotational speed is particularly low (If sum of our rotational speed min-1 and rolled diameter dpw mm is Dpw • <10,000) ;Bearing operating temperature is too high if carrying operating temperature is too high, the circuit gets softened, softened, thereby shorter life. Life adjusted by multiply by the given value of Fig.3.2 as the operating condition factor according to operating temperature. This however does not apply to carry out newly treated stabilized dimensions. ;Lubricant contaminated with foreign or humidity affairs if using special operating conditions, consulted with NTN engineering. Though a2>1 is used for specifically borne made of material increased or produced by special manufacturing methods, a2xa3<1 is used if lubrication conditions are not favorable. A-19 • Load Rating and Life Table 3.4 Machine application and requisite life (reference) ~4.4~12 12~30 30~60 60~ Machine application and requisite life (reference) L10h x103 hService classification Machines used for short periods or used only occasionally Short period or intermittent use, but