Bell less top charging system pdf

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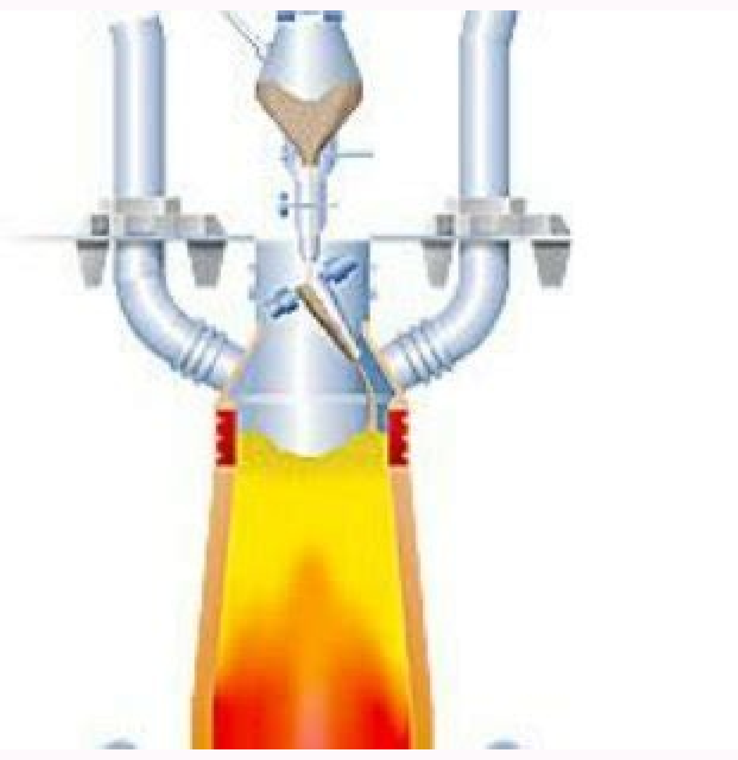

Bell less top charging system wiki. Who makes the best charging cables. Are cheap charging cables bad. How do i fix my battery charging system. Bell less top charging system working principle.

Blast Furnace Top Charging SystemsOne of the major technological improvements in the development of the blast furnace (BF) was the installation of charging equipment. Originally, raw materials were dumped into an open-mouthed stack through the tunnel head. BF operators realized that an open top furnace had two disadvantages, first the flammable gas leaving the stack could not be captured to fire boilers and second, the distribution of raw materials was causing furnace operating inefficiencies. The first efforts in 1832 in Germany to capture the gas resulted in the installation of a hinged lid over the charging hole which was only opened when the raw materials were dumped from the wheel-barrows. An opening was also placed in the side of the furnace located at the upper stack. This opening was fitted with a pipe known as a down comer which carried the BF gas to the ground level to be burned in auxiliary equipment.The issue of inefficiency of the BF due to raw material charging needed a more complicated solution which got evolved in several steps. The cause of this inefficiency, described by high fuel rates, was because of fine material being dumped through the charging hole in the centre of the BF remained at the centre of the heap while coarse particles rolled down to the furnace wall. This resulted in higher permeability in the BF periphery and so majority of the gas and heat moved up the walls. This was detrimental to the BF operation as the material at the centre of the BF reached in the bosh area unprepared for melting and at the same time excessive gas flow at the wall increased the lining wear.The first attempt to solve this burden distribution problem was the introduction of a charging apparatus 'cup and cone'. It consisted of an inverted conical cast iron funnel fixed to the top of the furnace feeding the charging hole. This cone was around 50 % of the diameter of the throat. Inside the cone, there sat a cast iron cup, which was suspended on a fulcrum beam opposite a counter-weight. The cup was raised manually by using a winch connected to the counter-weight. This apparatus succeeded in capturing the gas but still a large amount of coarse material rolled to the wall. The next modification to the cup and cone equipment was to hang a cast iron truncated cone inside the furnace. This resulted in moving the peak of raw materials closer to the wall so coarse particles could now also roll to the centre of the furnace resulting into better central permeability and gas flow.The next evolutionary step in charging which eliminated the cup and cone completely was to hang an inverted cone which opened downward into the furnace. This was the first bell-type BF top. This bell was successful in pushing the peak of wall which reduced gas flow around the periphery and increased gas flow in the centre, but BF gas escaped from the stack with each lowering of the bell. The solution to this was to have a bell and a lid for the charging hole. When material was dumped out of the wheel-barrow, the lid was up but the bell was closed keeping the gas in the BF. Then the lid was closed and the bell was dumped which also kept the gas in the BF and at the same time yielded the proper burden distribution. The results of these improvements were better physical and chemical reaction efficiency inside the BF which reduced fuel requirements, increased productivity, and decreased refractory lining wear.The single bell and hopper system permitted large quantities of gas to escape every time the bell was opened. It was not long before it was realized that by using a second bell and hopper above the first that a gas-tight space could be provided between the two bells to prevent the blast furnace process gas from escaping when the small bell was opened. The upper bell and hopper did not have to be as large as the lower one because several loads could be deposited through it onto the lower bell and the upper bell could be closed before the lower bell was opened for dumping the charges in the furnace. This two-bell system provided a more consistent flow of blast furnace gas for the stove system and reduced considerably the amount of off-gas lost to the atmosphere.The two bell system continued to be the only charging system for the blast furnaces around the world till S.A. Paul Wurth in Luxembourg, developed bell less top (BLT) charging system and the first successful industrial application of BLT charging system was in 1972. Soon BLT charging system took over from two bell charging system since it provided a number of advantages to BF operators. During 2003, Siemens VAI (now Primetals Technologies) introduced Gimbal concept of charging. This charging system has been successfully used for Corex and Finex processes for charging. The first application of Gimbal for charging a blast furnace was in 2009, when it has been used for C blast furnace of Tata steel at their Jamshedpur plant..Two bell charging systemThe two bell top charging system consists of a material distributor, a small bell, and a large bell as shown in the Fig 1. The large bell diameter is normally 1.5 m to 1.8 m smaller than the stock-line diameter. The lower edge of the upper face of the bell forms a seal against the bottom edge of the large bell hopper. The bells are connected by a rod and move in the vertical direction by means of air cylinders.The charge materials can be delivered to the furnace top by skip car and hoist or a conveyor belt and are dumped into the upper hopper or small bell receiving hopper. With the large bell closed, the small bell is lowered and the charge material is dropped onto the large bell. This procedure is repeated several times and then, with the small bell held closed, the large bell is lowered and the material is discharged into the furnace without allowing any of the process gases to escape. By using this charging method, the large bell, the small bell and hopper are subjected to heavy impact and severe abrasion and need replacement two or three times during the campaign of the furnace lining.Majority of the two-bell top charging systems are equipped with a revolving distributor. The small bell and hopper, small bell rod, and wearing plates are part of distributor. As each skip car of material is discharged on the small bell, the small bell and hopper rotate to a selected position and dump. This provides an improved distribution of material onto the large bell by placing the larger materials more evenly around the perimeter of the large bell. The bells are normally hard-surfaced in the area where they are subjected to the most severe wear from the impact of charging materials. Hard surfacing is also applied to the seating surfaces of the bells and hoppers. The bells are supported by bell rods, which are attached to counter-balances through a lever arrangement which restrict their motion to a vertical direction only. The small rod is hollow and the large-bell rod passes through it. Packing materials are used between the bell rods to prevent the escape of the gas. Fig 1 shows schematics of blast furnace two bell charging system.Fig 1 Schematics of blast furnace two bell chargingThe furnace charging is done in four steps as shown in Fig 2. During the step 1, the charge material is taken to the furnace top either by a skip car and hoist or by a conveyor belt and is delivered to a receiving hopper. Small bell and large bells both are in closed condition. The charge materials from skip or conveyor are dumped in hopper above the small bell. Gas flows from top of furnace through uptakes located in the dome (top cone). During the step 2, with the large bell closed, the small bell is lowered and the charge material is dropped on the large bell. This is repeated several times. During the step 3, the small bell is closed to prevent escape of gas to the atmosphere. The large bell is lowered and the charge material is discharged into the blast furnace. During the step 4, both the bells are closed and the system is ready for repeat charging.Fig 2 Steps in two bell charging system of blast furnaceWith each charge of the material from skip or conveyor, the small bell and hopper rotates to a selected position before the material is discharged. This provides an improved distribution of materials on the large bell. The bells and the seating surface of the bells and hopper are hard surfaced. The rod supporting the large bell passes through the hollow rod supporting the small bell, thus permitting independent operation of the bells. In this system of charging, the small bell, large bell and hopper are subjected to heavy impact and need replacement 2 to 3 times during a campaign of the BF lining. In this charging system, it is extremely difficult to maintain a gas tight seal for a top pressure higher than 100 kPa. Further two bell charging system has limitations towards burden distribution in the BF. Burden distribution plays a big part in achievement of high productivity in the BF.With the use of high top pressure, particularly in excess of 100 kPa, it is extremely difficult to maintain a gas-tight seal with the conventional bell and hopper arrangement. Also, the increase in productivity requirements needed the subsequent increase in the quantities of materials being handled by the top equipment. BF operators and designers realized the importance of burden distribution flexibility to enable better furnace performance and the modification of top charging equipment to achieve this. This led to the development of different kinds of top charging equipments to meet this requirement.The two-bell system needs less height than other systems and it is a comparatively simple device. The drawback is that the large bell seal and the large bell hopper gas seal are difficult to maintain at higher top pressure. A good seal cannot be held at the periphery of the large bell or the small bell as these areas are in the raw material flow. Because of the large size and heavy weight of the components, fabrication and maintenance is difficult, slow, and expensive and needs considerable furnace downtime to replace.The solution to this problem was to develop top charging equipment which can drastically reduce or overcome the problem of effective sealing associated with bell and hopper deterioration. Basically, two other types of top charging units were developed and are in operation on high top pressure BFs of today. One is a two-bell system with seal valves and a revolving chute above the small bell. The other is a bell-less system which incorporates a revolving chute.Two bell top with seal valves and revolving chuteThis system consists of a large bell, a small bell, and a seal chamber with a revolving chute added above the small bell as shown in Fig 3. Materials are introduced onto the small bell through two openings, each equipped with a seal valve. These seal valves are smaller than the small bell and the sealing surfaces are out of material flow, leading to effective sealing. The revolving chute consists of one or two openings, which direct the material flow evenly onto the small bell. The small bell hopper is fixed and the small bell has only vertical movement. The large bell and hopper are the same as in the two bell type.The advantage of this system is that it overcomes the deficiencies of the conventional two bell system. By placing gas seal valves above the upper bell, this arrangement ensures that the large bell always is at the same pressure. The large bell functions as only a burden distribution device and has no gas sealing requirement. The pressure-containing components are the seal valves and the small bell. Both of these are considerably smaller and easier to maintain during shorter duration the BF scheduled outages.Fig 3 Modifications of blast furnace two bell charging systemBell-type with adjustable armourA disadvantage of the bell-type charging system is the lack of burden distribution capability. This is normally defined as the ability to modify the coke and ore layer thickness across the radius of the stock-line of the furnace. With bell type charging equipment the placement of the burden material becomes more difficult with increasing BF dimension. The bell-type furnace top, which discharges the material into the furnace from the lip of the large bell, does not permit control over the burden distribution. BF operators have tried to vary the speed of the bell to change the distribution, but this had very little effect.An adjustable throat armour system, used in connection with bell type top charging equipment, was developed (Fig 3) to control and vary the burden distribution so that optimum permeability in the BF stack could be achieved. Adjustable throat armour varies the diameter at the furnace top and in some cases changes the slope of the armour as well. Material falling from the bell impacts against the armour and finds its position at the stock-line level dependent upon the set position of the armour. Adjustments are totally circumferential, but there is a limit to how much adjustment can be attained.There are several types of movable armour design. One of the adjustable armour designs consists of cast-steel plates arranged to form a cylinder, the diameter of which can be increased or decreased by the furnace operator while charging as shown in Fig 3(a). The cast-steel plates are separated and suspended so as to overlap each other. Movement is allowed under impact of the falling charge and part of the impact energy is converted into kinetic energy, which reduces abrasive wear. Each plate is hooked to a triangular lever. The triangular levers are pivoted in brackets attached to the furnace top shell, and are connected to the draw ring by links.Another type of armour which was developed also adopted hanging plates as shown in Fig 3(b). The plates are suspended from a fixed circular support and the drive linkage is attached to the bottom of each plate, allowing a range of settings from a vertical cylinder to a conical chute. One more form of adjustable throat armour which has been developed is a deflector-type, and is actuated by hydraulic cylinders as shown in Fig 3(c). Compared to the conical chute armour, this system needs much less vertical space between the bell and the stock-line within the furnace.Adjustable armour systems will continue to be used, especially in large furnaces, as long as bell charging systems are in use. Experience on very large furnaces has shown that proper burden distribution from a bell with a diameter higher than 7 m becomes more and more difficult. In such cases, a bell-less type charging equipment can be a very good alternative.Bell less top charging systemOne development in top charging equipment which resulted into a quantum jump in technology has been the bell-less top. It revolutionized BF top charging. Engineers of SA Paul Wurth in Luxembourg invented the 'bell less top' (BLT) charging system for the BF in 1969. Its first successful industrial application was in 1972. This design has rapidly gained in popularity since its first industrial application.The BLT charging system has several advantages namely (i) it allows nearly continuous charging of the BF since while the rotating chute is distributing the contents of one lock hopper bin, the other can be filled, (ii) it solves the problem of gas sealing under a high pressure operation, (iii) it provides flexibility in the distribution of BF burden since it can carry out one ring charging, multi ring charging, spiral charging, sector charging, and point charging both in manual and automatic mode, (iv) its charge regulating valve provides accurate and constant distribution of burden materials, (v) it provides improved BF operational stability and efficiency leading to better hot metal chemistry control, (vi) it contributes to increase in the BF productivity, (vii) it reduces BF coke rate and helps in achieving higher injection rates of pulverized coal, (viii) it contributes to higher campaign life due to reduced BF wall heat loads, (ix) it greatly reduces the maintenance time and frequency of maintenance of top equipment since the chute can be replaced within a short period of time, (x) the top equipment is of light and compact construction compared to other high pressure top charging system, (xi) the operating expenses (OPEX are lower), and (xii) it contributes to better BF performance as a result of precise burden distribution.The BLT charging system is a vital system to meet the present day operational challenges of BF. This is since (i) there is smoother BF operation with an added benefit of reduced variability of silicon content in the hot metal, (ii) control of wall heat losses from better charging results in increased lifetime of cooling elements or refractory lining, which in turn leads to longer BF campaign lifetime, iii) the technology and equipments are reliable and proven, and (iv) it can be integrated with skip hoist or conveyor belt charging system. However the height of the BLT top equipment is more than the two bell type charging system.By using the BLT charging system, one can frequently reach a desired burden distribution flexibly, which indicates that a desired gas distribution can also be achieved. The basic four charging methods are one point charging, multi-ring charging, single ring charging and sector charging where one point means the chute does not move at all and the sector charging indicates chute can rotate in a little region. When the inclination angle of the chute is large enough for single ring charging, the burden distribution is quite similar to the 'V' shape burden distribution achieved with bell-type charging systems. If the angle of the chute is quite small for a single ring, the distribution resembles the 'M' shape burden distribution also found in bell-top furnace. This means that bell-less charging system can mimic the full function of bell type charging system, and a flat burden distribution can be realized by multi-ring charging.The main component parts of the BLT charging system are (i) a movable receiving hopper, (ii) one or two material lock hoppers equipped with upper and lower seal valves and a material flow control gate, (iii) a central vertical feeding spout, (iv) a rotating adjustable angle distribution chute, (v) a rotational and tilting drive mechanism, (vi) hydraulic, lubrication and cooling systems, and (vii) monitoring and control systems.There have been two kinds of bell less charging systems, namely parallel type hoppers and centre type hopper. A non-uniformity of the burden distribution across the throat cross-section is a drawback of parallel hoppers, which was the first type to be invented, since the positions of two material storage bins are not on the centre line of the BF. Centre type hoppers have overcome the problem of non-uniform burden distribution, but can be only used under the normal or low smelting intensity rather than high smelting intensity due to the structure of the hoppers.In operation the skip or conveyor belt fills the lock hopper with the raw material. The lock hopper is then sealed and pressurized to the furnace top operating pressure. Each lock hopper is equipped with an upper and lower seal valve and a material flow control gate. The lock hoppers are used alternately. When one is being filled, the other is being emptied. By design the seal valves are always out of the path of material flow to prevent material abrasion, which reduces the probability of a sealing problem. The flow control gate opens to pre-determined positions for the various types of raw materials to control the rate of discharge. Lock hoppers are lined with replaceable wear plates. The lower seal valves and material flow control gates are in a common gas-tight housing with the material flow chutes, which direct the material through a central discharge spout located in the main gear housing.During the operation of the BFs equipped with BLT charging equipment, the skip or conveyor brings the charge material to the receiving hopper. When the lock hopper is empty, the material can enter after the pressure in the lock hopper has been reduced to that of the atmosphere by opening the top sealing valve and top throttle valves. After all material has been charged into the hopper, the top throttle valve and top sealing valve close. The lock hopper is then pressurized to the furnace top operating pressure. The lock hoppers are used alternately, that is one is being filled while other is being emptied.When the stock line has descended to the set-point height, sensed either by mechanical stock rods or by radar, the bottom sealing valve and bottom throttle valve both open. The material is then discharged into the BF through a distributor to the rotating chute, forming new layers on the burden surface. The distribution chute rotates around the vertical axis of the furnace and changes to predetermined angles with respect to the horizontal plane. This system has the flexibility of charging the materials in distinctive rings, in spiralling rings of smaller diameter, or of point / spot area filling. In addition, the quantity of material in each discharge area can be precisely controlled if desired.After all material has been charged by the chute, the bottom throttle valve and bottom sealing valve close. The stock rods (or radar) start following the burden surface after the bottom throttle valve closes. After the stock level has reached the set-point, the same charging procedure is repeated for the next material dump.By design, the seal valves are always out of the path of material flow to prevent material abrasion. This reduces the probability of sealing problem. The flow control gate open to predetermined positions for the various types of charge materials to control the rate of discharge. Lock hoppers are lined with replaceable wear plates. The lower seal valves and material flow gates are in a common gas tight housing with the material flow chute, which directs the material through a central discharge spout located in the main gear housing. Fig 4 shows the schematics of blast furnace bell less top charging.Fig 4 Schematics of blast furnace bell less top chargingRefinements to the design of the BLT system have focused on two areas namely (i) the elimination or reduction of the segregation of finer particles in the lock hoppers ahead of the rotating chute, and (ii) the development of a smaller unit for installation on the many smaller BFs already in operation. To address the first condition of small fines concentration, a design which incorporates a rotating chute into a large receiving hopper that is positioned above the single large lock hopper yields the desired result of dispersing the finer material evenly throughout the burden.The problem of installing a BLT system on the existing smaller furnaces has been addressed with the development of the compact top. This design employs a distribution chute which can be changed by means of a door installation and a design which permits access through the main gear unit. Additionally, the overall height of the lock hopper has been reduced by a different flow gate design and a double actuating seal valve design.Gimbal system of chargingThe purpose of the Gimbal system of charging is to facilitate controlled distribution of charge material into the BF via a Gimbal type oscillating chute through a holding hopper and variable material gate opening such that the pressurized charging system above can operate independently of the distribution system. It utilizes a conical distribution chute, supported by rings in a Gimbal arrangement, producing independent and combined tilting of the chute axis.The Gimbal system of charging has been successfully proven in the arduous high-temperature and high-pressure environment of the Corex melter gasifier vessel. This system has now been extended to the BF technology. The innovative Gimbal design allows infinite charging possibilities, for improving the burden distribution to the BF. The rugged simplicity of the drive provides an elegant solution at minimal investment cost. The Gimbal distributor, as part of the overall BF top charging system, offers a fully integrated charging solution, generating significant improvement in BF operation and maintenance cost. The design is suitable for installation at new BFs, and also for retro-fitting to the existing BF installations with minimal impact on existing equipment.In addition to the benefits achieved from the operational efficiencies, from the outset the aims of any new design when compared to the traditional bell-less top equipments is also to provide (i) inter-changeability with existing bell-less top equipments as an upgrade or retrofit, (ii) a simpler design eliminating the complex planetary and vulnerable tilting gear boxes of traditional designs, (iii) hydraulic drive actuation providing repeatability and accuracy over the entire life cycle, (iv) extended time period between required chute replacement periods, (v) reduced capital expenditure (CAPEX) and integration expenditure, and reduced OPEX by minimizing unplanned furnace downtime and lowering equipment lifecycle costs.For meeting these aims, Primetals Technologies and Woodings Industrial Corporation have a portfolio of hydraulic material distribution systems suitable for small, medium, and large BFs world-wide. The Gimbal system utilizes a conical distribution chute, supported by rings in a Gimbal arrangement, producing independent, and combined tilting of the chute axis.The portfolio comprises the Woodings hydraulic charging unit and Gimbal top, and it incorporates a full complimentary range of furnace top distribution equipment including distribution rockers, upper seal valves, hoppers, lower seal valves, material flow gates and goggle valve assemblies, all discharging through hydraulically driven distribution chutes.The purpose of the Gimbal top distribution system is to facilitate controlled distribution of charge material into the BF via a Gimbal type oscillating chute through a holding hopper and variable material gate opening such that the pressurized charging system above can operate independently of the distribution system.The tilting chute is driven by two hydraulic cylinders, mounted 90 degree apart. This type of suspension and drive arrangement results not in a rotation of the tilting chute, but in a circular path by superposition of both tilting motions. Independent or combined operation of the cylinders allows the chute axis to be directed to any angle, or even along any path. Motion is supplied by two hydraulic cylinders, each operating through a shaft, connecting rod, and universal joint in order to drive the Gimbal rings. Through the movement of the hydraulic cylinders, the distribution chute allows precise material distribution with potential for an infinite number of charging patterns at varying speeds. These include ring, spiral, centre, spot, segment or sector charging, providing complete control of material charging into the furnace.The whole distributor assembly is enclosed in a gas tight housing, which is mounted directly onto the top flange of the BF top cone. The housing contains a fixed inlet chute and a tilting distribution chute supported by rings in a Gimbal arrangement allowing independent and combined tilting of the chute axis. The assembly is made from a combination of stainless and carbon steel material with the fixed inlet chute and tilting chute body lined with ceramic material to give superior wear protection. A closed-circuit water cooling system supplies cooling water through the main shafts, Gimbal bearings, and universal joint bearings in order to cool the moving elements of the Gimbal distribution system.The key features of the Gimbal design are (i) simple, rugged design, using levers driven by the hydraulic cylinders, (ii) drive cylinders are mounted outside pressure envelope, hence not subject to hot and dusty service conditions, (iii) Gimbal ring arrangement gives simple tilting motion in two planes, which when superimposed gives 360 degrees distribution, and (iv) wear on the tilting chute is equalized around its circumference giving a long extended operational life.The BF Gimbal top is an automated, computer-controlled pressurized charging system designed to (i) receive charges of ore, coke, and miscellaneous materials in the holding hopper, independently of the distribution system below, (ii) release those discharges, as needed, to a dynamic distribution chute located below the holding hopper, and (iii) distribute material in prescribed patterns to the furnace stock-line in accordance with a predetermined charging matrix. Control of the Gimbal distribution chute is fully integrated into the overall furnace charging software. The system provides a high level of accuracy and control for the Gimbal movements and hence the positioning of the distribution chute. Gimbal material distributor is shown in Fig 5.Fig 5 Gimbal material distributor and charging systemThe Gimbal system is an elegant, simple and rugged charging system designed for high temperature and high pressure operation. The system facilitates controlled distribution of charge material into the BF through a Gimbal type oscillating chute through a holding hopper and variable material gate opening such that the pressurized charging system above can operate independently of the distribution system. Gimbal utilizes a conical distribution chute, supported by rings in a Gimbal arrangement producing independent and combined tilting of the chute axis.The Gimbal top of the BF has both the operational advantages and the engineering advantages. The operational advantages of a charging system incorporating a distribution chute and lock hopper system are well proven on the blast furnaces worldwide. The Gimbal top, proven in demanding Corex applications, allows a similar charging philosophy to be followed, and open more possibilities for charging improvement. The principle operational advantages of improved material distribution by chute and lock hopper system are (i) the BF can be optimized in terms of fuel rate, (ii) coke rate decreases compared to two bell without moving armour, (iii) fuel injection rates can be increased and this offers the potential of replacing expensive coke with cheap coal or natural gas, (iv) improvement in fuel injection allow increases in blast temperature, oxygen enrichment and hence increased productivity, and (v) cheaper maintenance avoiding long shutdowns for bell changes.Material distribution by chute gives improved (i) material distribution control, (ii) gas utilization, (iii) control of furnace wall temperatures to reduce heat loads and extend furnace life, and (iv) possibility of fines charging at furnace walls. Further specific advantages by the use of a conical distribution chute and Gimbal are (i) the conical shape prevent material spillage over the side, as is possible with an 'open' chute which allows precise positioning of the materials at the stock line, (ii) utilizing the many paths of the chute any possible charge imbalance due to the furnace top hopper geometry can be corrected, (iii) chute liners wear at an even rate around the full inner surface, this achieves stable material flow characteristics and falling curves over time, and (iv) Gimbal distributor does not need the extreme accuracy of the furnace top ring normally associated with other alternatives.The simplicity of the Gimbal compared to other solutions gives a number of engineering advantages. The engineering advantages include (i) simple lever mechanisms allow the drive cylinders to be mounted outside the pressure envelope and hence not subject to the hot and dusty service conditions, (ii) tilting chute liners wear at an even rate around the full inner surface, since material flows over full periphery as chute makes a full revolution and this prolongs the wear life of the component (a life of 5 years is predicted for the tilting chute), (iii) the conical-shape chute retains its ceramic lining in place, (iv) the use of expensive high-precision gears (as on needed by some alternatives) is avoided, (v) the Gimbal bearings are cooled with water on a closed-circuit cooling system and this reduces the potential for leakage into the furnace, or water contamination, and (vi) the bearings on the Gimbal assembly itself are sealed for life.

Community. Bell, California, is a small suburb of Los Angeles that covers 2.5 square miles (6.5 km 2), with a population of approximately 38,000. It is one of the poorer cities in Los Angeles County, with almost one in six residents lives below the poverty line. In 2009, Bell's per capita income was about $24,800 and 90% of its residents were Hispanic or Latino. 72022/6/ · I thought it would be fun. That's what I told my friend Mack when I asked her to drive with me from New Orleans to Chicago and back in an ... 72022/6/ · I thought it would be fun. That's what I told my friend Mack when I asked her to drive with me from New Orleans to Chicago and back in an ... 386-95 · 2022/8/ Trucks & 4Runners - Charging system questiion(s)... - Hey folks! I acquired an '87 4Runner a few months ago, and I've been googling how to repair some of the issues it has. Here recently, it wouldn't crank. The battery was at or juuuuust below 12VDC, and nothing would happen when I turned the key. I jumped it, and... 52021/4/ · Resistance should be in the range of 0.1-0.5 Ohms. (Reading will vary depending on system, check service manual for specification) Generic Specs: 22 amp system produces about 0.2 to 0.4 ohms; 32 amp system produces about 0.1 to 0.2 ohms; 45 amp system produces about 0.1 to 0.2 ohms; Stator IB test or Ground Check: Switch your multi-meter to Ohm ... 112021/11/ · Here are some of the reasons why Bell Canada was selected as one of Canada's Top 100 Employers (2022), Canada's Top Family-Friendly Employers (2022) and Montreal's Top Employers (2022): Bell Canada is committed to creating an inclusive, equitable and accessible workplace, and recently set new targets for representation of Black, Indigenous and people of ... Buy CyberPower SL700U Standby UPS System, 700VA/370W, 8 ... 2 USB CHARGING PORTS: Share 2.4 amps to charge and power tablets, smartphones ... They tend to be either a couple of minutes or 4 hours. Indeed, it was less than 48 hours after receiving this UPS that we had an outage. Sadly, that one lasted 4 hours. But, the UPS gave it's ... Buy CyberPower SL700U Standby UPS System, 700VA/370W, 8 ... 2 USB CHARGING PORTS: Share 2.4 amps to charge and power tablets, smartphones ... They tend to be either a couple of minutes or 4 hours. Indeed, it was less than 48 hours after receiving this UPS that we had an outage. Sadly, that one lasted 4 hours. But, the UPS gave it's ... 52021/4/ · Resistance should be in the range of 0.1-0.5 Ohms. (Reading will vary depending on system, check service manual for specification) Generic Specs: 22 amp system produces about 0.2 to 0.4 ohms; 32 amp system produces about 0.1 to 0.2 ohms; 45 amp system produces about 0.1 to 0.2 ohms; Stator IB test or Ground Check: Switch your multi-meter to Ohm ... 386-95 · 2022/8/ Trucks & 4Runners - Charging system questiion(s)... - Hey folks! I acquired an '87 4Runner a few months ago, and I've been googling how to repair some of the issues it has. Here recently, it wouldn't crank. The battery was at or juuuuust below 12VDC, and nothing would happen when I turned the key. I jumped it, and... Community. Bell, California, is a small suburb of Los Angeles that covers 2.5 square miles (6.5 km 2), with a population of approximately 38,000. It is one of the poorer cities in Los Angeles County, with almost one in six residents lives below the poverty line. In 2009, Bell's per capita income was about $24,800 and 90% of its residents were Hispanic or Latino.

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