

Abstract:

*The segregation-free iron powder JIP™ Cleanmix™
ZERO reducing variation in weight of green parts in*

ktgtiwnctkvgu" eqttgurqpf" vq" vjku" v{rgl} V{rg" *4+ " ku" cp" wfwncvkqp" v{rg. "kp" yjkej" vjg" ygkijv" xctkgu" ykvj" c" nqpi" rgtkqf" Vjg" cdqyg/ o gpvkqpgf" kpfxkfwcn" xctckvqpu" vcmg" c" hqt o" yjkej" ku" qxgtckf" qp" vjgug" wfwncvkqpu" V{rg" *5+ " ku" uwffgp. " tcrkf" xctckvqp" qh" ygkijv" vjcv" qeewtu" yjgp" rtguukpi. " yjkej" jcf" dggp" rgtqto g f" d{ " eqpvkpwqu" eq o / rcevqp. " ku" uvqr rgt" htq o" uq o g" tgcup" c f" vjgp" tguvctvgf" Pqt o c n n{. " vjg" ygkijv" qh" vjg" hktuv" rctv" chvgt" rtguukpi" ku" tguw o g f" ku" nctig" kp" eq o rctkuqp" ykvj" vjcv" dghqg" vjg" uvqr. " cpf" vjgp" itcfwcn{ " eqpxgtigu" qp" vjg" cxgtcig" ygkijv" cu" eqpvkpwqu" eq o rcevqp" rtqeggfu³²⁶³⁴⁺⁰

Tgictfkpi" vjg" wfwncvkpi" nqpi/ rgtkqf" xctckvqp" qh" ygkijv" ujqyp" cdqyg" cu" *4+. " ykvj" rtqitgu" kp" rtguu" vgej/ pqqni { . " vjgug" xctckvqpu" jcxg" dggp" tgfwegf" d{ " o gcuw/ kpi" vjg" ygkijv" qh" gcej" rctv" cpf" hggfki" dcem" vjku" kphqt/ o cvkqp" vq" vjg" eq o rcevqp" eqpfvkqpu

Jqygxt. " kp" vjg" ecug" qh" nctig. " fkueqpvkpwqu" xctck/ vkqpu" qh" ygkijv" nkmg" vjqug" yjkej" qeewt" dghqg" qt" chvgt" c" rtguu" uvqr. " vjgtg" ku" pq" ejkqeg" dwv" vq" fgrgp" qp" c" tguvqpug" dcugf" qp" vjg" gzrgtkpeg" qh" vjg" qrgtcvq. " qt" vq" tglgev" vjg" fghgevkg" rctvu" htq o" vjku" rgtvqp" qh" qrgtcvq" Jqygxt. " vjku" tgfwegu" rtqfwev" {kgnf" Kp" vjg" rtgugpv" tguvctej. " c" pgy" ugitgicvkq/htgg" ktqp" rgy fgt" LKR^{VO}" Engcpokz^{VO}" \GTQ" ycu" fgxnqr g f" vq" tgfweg" fghgevu" qh" vjku" v{rgl} Vjku" rcrgt" fguetkdu" vjg" cfxcpcigu" qh" vjku" rtqfwev" cpf. " kp" rctvkwnt. " tgrqtvu" vjg" tguwvu" qh" xctkqu" gzrgtk o gpvu" cpf" fkuewukqp" kp" eqppgevkqp" ykvj" vjg" hknn/ kpi" rtqrgtv{ " cpf" fkuejctikpi" rtqrgtv{ " qh" vjg" pgy" rgy / fgt

2. Experiments

2.1 Test Materials

Vjg" vguv" o cvgtknu" wugf" kp" vjku" uvwf{ " ygtg" Engcp/ okz^{VO}" \GTQ. " kp" yjkej" 4 " " eqrrgt" rgy fgt" cpf" 20; " " itcrjkvg" rgy fgt" cu" c n n q{ kpi" rgy fgtu" ygtg" okzgf" ykvj" vjg" cvqok|gf" ktqp" rgy fgt" LKR^{VO}" 523C. " cpf" cu" c" eq o rctk/ uqp" o cvgtknu. " eqpxgpvqpcn" Engcpokz" *jgtgkpvhtg. " oewt/ tgp" rtqfwevö+. " yjkej" ycu" okzgf" ykvj" vjg" uc o g" c o qwpvu" qh" eqrrgt" cpf" itcrjkvg

Kp" cfkvpq. " cu" igpcten" eq o rctkuqp" o cvgtknu. " eqp/ xgpvqpcn" okzgu" qh" |kpe" uvgtcvg" qt" gvj{ ngpg" dkuuvgt/ c okfg" *GDU+ " ygtg" rtgrctgf" d{ " okzkpi" hqt" 37" o kp" ykvj" c" X" v{rg" okzgt

2.2 Evaluation of Mixed Powders

2.2.1 Powder properties

Crrctgpy" fgpuv{ " cpf" hnqycdkkv{ " ygtg" o gcuwtgf" ykvj" c" 407" o o " hwpngn" cpf" 47" e o⁵ ewr" kp" ceeqfcpge" ykvj" LKU" \ " 4726" cpf" LKU" \ " 4724. " turgvkvxgn{ " LKU" <Lcrc/ pgug" Kpfwvutkcn" Uvcpfctfu+ " Gcej" o gcuwtg o gpv" ycu" rgt/ hqt o g f" 5" vk o gu. " cpf" vjg" cxgtcig" xcnwg" ycu" qdvckpgf



Fig. 2 Discharge test from hopper

2.2.2 Index of filling characteristic

Vjg" hqnnqykpi" v y q" v{rgu" qh" gxcnvcvkqpu" ygtg" rgt/ hqt o g f" hqt" uk o r n g" o gcuwtg o gpv" qh" vjg" hnqy" cpf" hknnkpi" dgjcxkqt" htq o " c" hknngt" ujqg" cpf" hggfgt" kpvc" c" fkg" ecxkv{ 0 *3+ " Jqrrgt" Vguv⁴⁺

Cu" ujqyp" kp" Fig. 2. " c" urgekkgf" c o qwpv" qh" ktqp" rgy / fgt" ycu" kpvtfwegf" kp" c" urgekkgf" ujcrg" kpvc" cp" cet{ n" eqpvckpgt. " chvgt" yjkej" vjg" 407" o o " fkuejctig" jng" *qtkheg+ " ycu" qrgpgf" cpf" vjg" rgy fgt" ycu" fkuejctigf" C" rgy fgt" ykvj" gzegngpv" hnqy" cdkkv{ " cpf" hknnkpi" rtqr / gtv{ " dgikpu" vq" fkuejctig" uk o r n{ " wrqp" qrgpkpi" qh" vjg" qtkheg. " vjg" ecxg" kp" vjg" rgy fgt" nc{gt" urtgcfu" cu" fku/ ejctig" rtqeggfu. " cpf" hkpcn. " fkuejctig" uvqr" yjgp" vjg" ecxg" tgejgu" vjg" vqr" qh" vjg" rgy fgt" nc{gt" Qp" vjg" qvjgt" jcpf. " c" rgy fgt" ykvj" kphgtkt" hnqycdkkv{ " cpf" hknnkpi" rtqrgtv{ " fqu" pq" fkuejctig" yjgp" vjg" qtkheg" ku" qrgpgf" C" vjku" vk o g. " fkuejctig" ku" gpeqwtcigf" d{ " vcr / rkpi" vjg" vqr" qh" vjg" eqpvckpgt" ykvj" c" egtvckp" hqteg" Chvgt" vjg" hktuv" vcr. " vjg" ecxg" kp" vjg" rgy fgt" nc{gt" fqu" pqv" urtgcf" qt" urtgcfu" qpn{ " unki jvn{. " cpf" fkuejctig" uvqr" Kp" vjku" ecug. " vcr rkpi" ku" rgtqto g f" c ic k p" cpf" ku" tgrgcvgf" wvkn" vjg" ecxg" rpgvctvgu" vjqtqwi" j" vjg" vqr" qh" vjg" rgy fgt" nc{gt" Vjg" hnqy" cdkkv{ " cpf" hknnkpi" rtqrgtv{ " qh" c" rgy fgt" ecp" dg" lwf igf" vq" dg" kphgtkt" cu" vjg" pw o / dgt" qh" vcru" kpetgcugu. " cpf" vjg" hnqy" cdkkv{ " cpf" hknnkpi" rtqrgtv{ " ecp" dg" lwf igf" vq" dg" uwrgtkqt" cu" vjg" ykf vj" qh" vjg" crgtvwtg" cv" vjg" vqr" qh" vjg" rgy fgt" nc{gt" dgeq o gu" ykfgt

*4+ " Cfjgukqp" qh" Rctvkengu

Vjg" hnqycdkkv{ " cpf" hknnkpi" rtqrgtv{ " qh" c" rgy fgt" ku" vjquw" vj" vq" dg" kphnwgpegf" d{ " vjg" kpvgtckecn" kpvgtcevqp" dgvyggp" vjg" rctvkengu" Jgtg. " vjg" eqjgukqp" cpf" cping" qh" kpvgtpcn" htkevqp" dgvyggp" rctvkengu" ygtg" o gcuwtgf" d{ " rgtqto kpi" c" ujcgt" hcnwtg" vguv" qh" vjg" rgy fgt" nc{gt" wukpi" c" rgy fgt" dgf" vguvt" *RVJ P/35DC= " Ocpwhce/ wwtgf" d{ " Ucpm{ q" Rkq/ Vgej" Eq0. " Nvf0+0

Figure 3" ujqyu" c" uejg o cvke" fkcitc o" qh" vjg" ujcgt" vguv" Vjg" rgy fgt" yjkej" ku" vq" dg" o gcuwtgf" ku" hqt o g f" kpvc" c" rgy fgt" dgf" ykvj" vjg" vj kempgu" qh" 5" o o " qp" vjg" hkzgf" rncvg. " cpf" rtgnk o k p c t{ " rtguukpi" cv" 80; " mRc" ku" rgtqto g f" Pgzv. " c" ygkijv" qh" vjg" urgekkgf" ygkijv" ku"

rncegf"qp"vjg" rqy fgt" dgf." cpf" vjku" oqxkpi" rncvg"ku"
oqxgf" jqt|qpvcmm{" cv" vjg" urggf" qh" 42" o o l o k p" d{"

kpetgcug" chvgt" tguvctvkpi" ku" nctig." vjg" ygkijv" itcfwcm{"

vjg" ewttgpi" rtqfwev. "c" eqpxgpi vkqpcn" okz" qh" | kpe" uvgtcvg"

hkgf0" Vjku" oc { " dg" fwg" vq" vjg" hcev" vjcv" vjg" xqnw" og" tcvkq" qh" vjg" hknngt" ujqg" cpf" ecxkv { " ** Xqnw" og" qh" hknngt" ujqg" + " l" * Xqn/ wog" qh" ecxkv { ++" ycu" cr rtqzk" ocvg { " 92" kp" eqpvkpwqwu" eqo rcevqkq. " dwv" ycu" uocnn" kp" vjg" hknkpi" gzrgtk" ogpv. " dgkpi" cr rtqzk" ocvg { " 8=" cu" c" tguwv. " vjg" ghheg" qh" tgrnceg/ ogpv" *vtcpuhgt+ " qh" rqy fgt" fguetkdgf" rtgxkqwu { " ycu" uocnn" kp" eqpvkpwqwu" eqo rcevqkq. " cpf" vjg" fkhgtgpeg" kp" xctkcvkq" qh" ygki jv" ycu" cnuq" nguu" tgoctmcdng" d { " c" eqttg/ urqpfkpi" coqwpv0" Kv" ku" vjqwi jv" vjcv" vjg" xctkcvkq" qh" ygki jv" qh" kpfxkfwcn" rctvu" fwtkpi" eqpvkpwqwu" eqo rcevqkq" ecp" cnuq" dg" tgfwegf" kp" eqo rctkuq" ykvj" vjg" ewttgpi" rtqfwev0

4. Conclusion

Kp" qtfgt" vq" kpxgukicvg" vjg" rqy fgt" rtqrgtkvku" cpf" xctkcvkq" qh" ygki jv" fwtkpi" eqo rcevqkq" qh" Engcp okz"VO" \ GTQ" hqt" jki j" fgpukv { " eqo rcevqkq. " kvu" dgjcxkqt" ycu" qdugt xgf" htqo" xctkqwu" cpingu. " cpf" vjg" hqnnqy kpi" pgy" mpqyngfig" ycu" qdvckpgf0

*3+ " Tgictfkpi" rqy fgt" rtqrgtkvku. " Engcp okz" \ GTQ" jcu" nctig" cr rctgpv" fgpukv { " cpf" gzegngpv" hnqy cdknk { 0

*4+ " Kp" vjg" jqr rgt" vguv. " yjkej" ku" cp" kpfgz" qh" vjg" hknkpi" ejctcevgtkuvke. " Engcp okz" \ GTQ" fkurnc { gf" cp" gzvto gn { " jki j" fkuejctikpi" rtqrgtv { " cpf" vjg" ykfvj" qh" vjg" crgtwtg" chvgt" fkuejctikpi" ycu" cnuq" nctig. " uwi/ iguvkpi" vjcv" vjku" rtqfwev" jcu" cp" gzegngpv" hknkpi" rtqr/ gtv { 0

*5+ " Kp" vjg" rqy fgt" nc { gt" ujget" gzcokpcevqkq. " Engcp okz" \ GTQ" fkurnc { gf" uocnn" cfjgukqp0" Dcugf" qp" vjku. " Engcp okz" \ GTQ" ku" eqpukfgtgf" vq" ujqy" c" jki j" fku/ ejctikpi" rtqrgtv { " cpf" hknkpi" rtqrgtv { 0

*6+ " Vjg" ygki jv" ejcpig" tcvg" qh" Engcp okz" \ GTQ" chvgt" eqo rcevqkq" uvqr" cpf" tguvctv" kp" eqpvkpwqwu" eqo rce/ vkqp" ycu" cnuq" hqwpf" vq" dg" uocnn" kp" eqo rctkuq" ykvj" vjg" eqpxgpi vkqpcn" Engcp okz" rtqfwev0

*7+ " Vjg" jki j" hknkpi" rtqrgtv { " qh" Engcp okz" \ GTQ" eqwnf" cnuq" dg" eqphktogf" kp" c" hknkpi" vguv. " cpf" kv" ycu" uwi/ iguvgf" vjcv" vjg" kpvgtpcn" fgpukv { " fkuvtkdwvkqp" ykvj kpi" ppg" rctv" eqwnf" cnuq" dg" tgfwegf0

D { " wukpi" Engcp okz" \ GTQ. " kv" eqpukfgtgf" rquukdng" pqv" qp { " vq" tgfweg" xctkcvkqpu" qh" ygki jv" dgyvggp" itggp" rctvu" fwtkpi" eqo rcevqkq. " dwv" cnuq" vq" tgfweg" vjg" kpvgtpcn" fgp/ ukv { " fkuvtkdwvkqp" kp" kpfxkfwcn" rctvu0" Vcmkpi" cfxcpcig" qh" vjku" hgecvwtg. " cr rncevkq" qh" Engcp okz" \ GTQ" vq" o cuu" rtq/ fwevkq" qh" jctf/ vq/ hqt o" rctvu. " yjkej" eqwnf" pqv" dg" o cuu/ rtqfwegf" kp" vjg" rcuv" dgecwug" vjg" rqy fgt" fkv" pqv" hkn" vjg" fkg" wphqton { " ku" gzrgevfg0

References

" 3+ " Pcmvcpk. " M0= " Vcmg o qvq. " U0= " Wgvc. " K0= " Mqpfq. " O0" oC" uvwf { " qh" cgtc/ vkqp" rqy fgt" hknkpi" ogvjqf" hqt" jki j" rgthqto cpeg" R1O" rctvu0o" Cfxcepgf" kp" Rqy fgt" Ogvcnmwti { " cpf" Rctkewncvg" Ocvgtknu0 3 ; ; ; . " xqn0 9. " r0 4 ; ; 65280

" 4+ " Yw. " E0/ [0= " Fkjqtw. " N0= " Eqemu. " C0" E0" H0" oVjg" hnqy" qh" rqy fgt" kvq"

uk o r ng" cpf" uvgr r gf" fkgu00" Rqy fgt" Vgej p q n q i {0" 4225." xq n 0"356."
r0"4665;0
" 5+"

- Vgej p q n q i {."3; ; : 0" F q e v q t" q h" G p i k p g g t k p i" V j g u k u 0
- 32+ P c m c v c p k." M 0=" M c v u w m c y c." [0=" M q d c { c u j k." V 0=" V c m g o q v q." U 0" o G h h g e v" q h" c r r c t g p v" f g p u k v { " k p" c" h k n n g t" h q g" q p" v j g" y g q i j v" x c t k c v k q p 0 6" C d u v t c e v u" q h" C w w w o" O g g v k p i" q h" v j g" L c r c p" U q e k g v { " q h" R q y f g t" c p f" R q y f g t" O g v c m n t i { " 4 2 2 9 0" M { q v q." r 0" 3 3 4 0
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- 34+ P c m c v c p k." M 0" o G h h g e v" q h" v j g" J k u v q t { " q h" R q y f g t" O q x g o g p v" q p" H k n n / k p i" F g p u k v { 0 6" L q w t p c n" q h" v j g" L c r c p" U q e k g v { " q h" R q y f g t" c p f" R q y f g t" O g v c m n t i { 0" 4 2 3 3." x q n 0" 7 : ." r 0" 3 4 7 6 3 4 9 0
- 35+ W g p q u q p q." U 0=" Q | c m k." [0=" U w i k j e t c." J 0" o F g x g n q r o g p v" q h" c" j k i j" H n q y c d n g" U g i t g i c v k q p / h t g g" k t q p" D e u g f" O k z" y k v j" Y c z" N w d t k e c p v 0 6" L q w t p c n" q h" v j g" L c r c p" U q e k g v { " q h" R q y f g t" c p f" R q y f g t" O g v c m n t i { 0" 4 2 2 3." x q n 0" 6 : ." r 0" 5 2 7 6 5 3 2 0
- 36+ Q | c m k." [w m k m q=" W p c o k." U j k i g t w=" W g p q u q p q." U c v q u j k 0" M c y c u c m k" U v g g n" V g e j p k e c n" T g r q t v 0" 4 2 2 4." p q 0" 6 9." r 0" 6 : 6 7 6 0
- 37+ W g p q u q p q." U 0=" Q | c m k." [0=" Q i w t c." M l=" P c m c p q." [0" o H c e v q t u" F g v g t / o k p k p i" H n q y c d k n k v { " q h" U g i t g i c v k q p / h t g g" k t q p" R q y f g t" y k v j" N w d t k / e c p v" E q p v c k p k p i" Y c u 0 6" L q w t p c n" q h" v j g" L c r c p" U q e k g v { " q h" R q y f g t" c p f" R q y f g t" O g v c m n t i { 0" 3 ; ; : ." x q n 0" 6 7." r 0" : 6 ; 6 : 7 5 0

