OBRAZAC 1

elektronski potpis projektanta	elektronski potpis revidenta
Dušan Džudović Digitally signed by Dušan Džudović Date: 2024.11.27 08:36:22 +01'00'	CIVIL ENGINEER Digitally signed by Aleksandar Laković DN: c=ME, ou=Pravno lice, 2.5.4.97=VATME-02809010, o=Civil Engineer doo, serialNumber=77059, sn=Laković, givenName=Aleksandar, cn=Aleksandar Laković Date: 2024.12.06 08:50:50 +01'00'

INVESTITOR[1]	OŠ "Bajo Jojić" i Srednja Mješovita škola Andrijevica/ Opština Andrijevica
OBJEKAT[2]	Rekonstrukcija- dogradnja objekta fiskulturne sale u sklopu OŠ "Bajo Jojić" i Srednje Mješovite škole Andrijevica
LOKACIJA[3]	Branka Deletića bb, na dijelu katastarskih parcela br. 697 /1, 698, 699/1, Andrijevica
VRSTA TEHNIČKE DOKUMENTACIJE[4]	GLAVNI PROJEKAT
PROJEKTANT[5]	“URBI PRO” d.o.o. Podgorica
ODGOVORNO LICE[6]	Dušan Džudović,dipl.inž.arh.
GLAVNI INŽENJER[7]	Dušan Džudović,dipl.inž.arh.

[1] Naziv/ime investitora
[2] Naziv projektovanog objekta
[3] Mjesto građenja, planski dokument, urbanistička parcela, katastarska parcela
[4] Idejno rješenje, idejni projekat, glavni projekat odnosno projekat izvedenog objekta projekat (ako je u pitanju naslovna strana cjelokupne tehničke dokumentacije)
[5] Naziv privrednog društva, pravnog lica odnosno preduzetnika koji je izradio tehničku dokum entaciju
[6] Ime odgovornog lica u privrednom društvu, pravnom licu odnosno ime i prezime preduzetnika
[7] Ime i prezime glavnog inženjera

elektronski potpis projektanta	elektronski potpis revidenta
Digitally signed by Vuk Kasalica Date: 2024.10.10 13:31:21 CEST Reason: URBI-PRO D.O.O.	

INVESTITOR[1]	OŠ "Bajo Jojić" i Srednja Mješovita škola Andrijevica/ Opština Andrijevica
OBJEKAT[2]	Rekonstrukcija- dogradnja objekta fiskulturne sale u sklopu OŠ "Bajo Jojić" i Srednje Mješovite škole Andrijevica
LOKACIJA[3]	Branka Deletića bb, na dijelu katastarskih parcela br. 697 /1, 698, 699/1, Andrijevica
DIO TEHNIČKE DOKUMENTACIJE[4]	Knjiga 5.2-Sprinkler instalacije
PROJEKTANT[5]	"URBI PRO" d.o.o. Podgorica
ODGOVORNO LICE[6] /	Dušan Džudović,dipl.inž.arh.
ODGOVORNI INŽENJER[7] /	Vuk Kasalica, dipl.ing.maš.,
SARADNICI NA PROJEKTU[8]	

[1] Naziv/ime investitora
[2] Naziv projektovanog objekta
[3] Mjesto građenja, planski dokument, urbanistička parcela, katastarska parcela
[4] Arhitektonski projekat, građevinski projekat, elektrotehnički projekat odnosno mašinski projekat (ako je u pitanju naslovna strana dijela tehnički dokumentacije)
[5] Naziv privrednog društva, pravnog lica odnosno preduzetnika koji je izradio dio tehničke dokumentacije
[6] Ime odgovornog lica u privrednom društvu, pravnom licu odnosno ime i prezime preduzetnika
[7] Ime i prezime odgovornog inženjera
[8] Ime i prezime saradnika na izradi dijela tehnički dokumentacije

URBI.PRO
Društvo sa ograničenom odgovornošću
Podgorica

Društvo za planiranje, projektovanje, konsalting, inženjering
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FOLDER 2	**ARHITEKTONSKI PROJEKAT**
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1. TEKSTUALNA DOKUMENTACIJA

1.1 TEHNIČKI OPIS INSTALACIJE

1. LOKACIJA INSTALACIJE

Stabilna automatska instalacija za gašenje požara vodom – sprinkler instalacija predviđena je za gašenje požara u dograđenom objektu fiskulturne sale u sklopu OŠ "Bajo Jojić" i Srednje mješovite škole u Andrijevici

2. OPIS INSTALACIJE

Sprinkler instalacija spada među najefikasnije instalacije za gašenje požara. To je automatska stabilna instalacija za gašenje požara rasprskavajućim mlazom vode, koja u pripremnom položaju prije aktiviranja ima zatvorene mlaznice, koje se otvaraju na određenoj povišenoj temperaturi i na taj način započinje automatsko aktiviranje instalacije. Cjevovodi koji dovode vodu do mlaznica su pod stalnim pritiskom vode. Gašenje požara se vrši određenim brojem mlaznica, zavisno od brzine širenja požara.
Pored gašenja, pri aktiviranju sprinkler instalacije istovremeno vrši i dojavu požara davanjem alarmnog signala.

3. TIP INSTALACIJE

Usvojena je suva sprinkler instalacija, jer u objektu koji se štiti postoji mogućnost zamrzavanja vode u cjevovodima. Prostorija za smještaj opreme obezbijeđena je od niskih temperatura.
Cjevovodi suve sprinkler instalacije su stalno napunjeni vodom pod pritiskom do klapne sprinkler ventila, dok je sa gornje strane klapne cjevovod pod vazdušnim pritiskom. Pritisak vazduha u sistemu u stanju mirovanja se održava preko kompresora u sprinkler podstanici.
Od trenutka aktiviranja instalacije, počinje da izlazi vazduh, a zatim vrlo brzo dolazi voda do mjesta gde se pojavio požar.

4. OSNOVNI ELEMENTI INSTALACIJE

Sprinkler instalacija se sastoji od sledećih elemenata:
- suvi sprinkler alarmni ventil,
- kompresor,
- cijevna mreža na kojoj su postavljene sprinkler mlaznice,
- sprinkler mlaznica – viseća, stojeća (fiskulturna sala),
- dovodni cjevovod,
- ostala prateća armatura.

5. SPRINKLER PODSTANICA

Sprinkler podstanica se nalazi u sklopu objekta (dato grafičkom dokumentacijom). Temperatura u sprinkler stanici mora biti iznad +5°C.

Signali od ovalnih zasuna:
Mikroprekidači na ovim ovalnim zasunima treba da daju, u okviru sistema za nadzor i upravljanje ili sistema za dojavu požara, signal ako ventil nije u odgovarajućem položaju.

Signal presostata mokrog sprinkler ventila:
Presostat sprinkler ventila daje signal da je podignuta klapna mokrog sprinkler ventila. Ovakav signal znači moguć požar jer klapna sprinkler ventila može biti malo otvorena usled zaglavljivanja klapne sprinkler ventila. Zbog mogućnosti da se desi takva situacija, ovaj signal se šalje protivpožarnom

sistemu. Ovaj signal treba da indukuje interni alarm u prostoriji sistema za nadzor i upravljanje. Akcije koje moraju uslijediti moraju biti adekvatne za stanju požara, ali bez izvršnih funkcija protivpožarne centrale (primjer: obaranje protivpožarnih klapni)

Signali indikatora protoka:
Indikator protoka je uređaj koji usled kretanja vode kroz cijev (u jednom smjeru) daje kontakt koji se prenosi ka protivpožarnoj centrali i prema automatskim ventilima sa elekro pogonom. Ovakav signal se tretira kao siguran požar. Izvršne funkcije protivpožarne centrale moraju biti adekvatne stanju požara. Indikator protoka se nalazi na horizontalnom dijelu cjevovoda, i to na dovodnom cevovodu iz sprinkler pumpne stanice. Za ovaj sistem predviđena su 2 indikatora protoka (fiskulturna sala i ostale prostorije).

Priključak za vatrogasno vozilo:
je priključak koji se nalazi na prizemnom nivou objekta, na oko 1.0 m iznad nivoa terena, i on je još jedna mjera sigurnosti, koja omogućava da se vatrogasno vozilo priključi na sprinkler sistem i da na taj način gasi požar. Ova dodatna mjera sigurnosti je predviđena u slučaju da u sistemu nema dovoljno vode.

Alarmna suva sprinkler stanica:
sadrži nepovratnu klapnu koja je u zatvorenom položaju usled jednakih pritisaka uzvodno i nizvodno od klapne. Ovo uravnoteženje pritisaka se obavlja preko bajpasne klapnom. U slučaju požara, ampula sprinkler mlaznice puca. Pritisak iznad klapne (nizvodno) pada, omogućujući klapni da se otvori i propusti potrebnu količinu vode do sprinkler mlaznica. Detaljnije objašnjenje je dato tačkom 8. Način rada instalacije.

6. MREŽA CJEVOVODA

Mreža cjevovoda ima osnovnu funkciju da spaja sprinkler mlaznice sa izvorom vode, osiguravajući osnovne potrebne parametre – količinu vode i pritisak. Vodi se tako da se pokrije cijela površina koja se štiti. Izrađuje se od crnih bešavnih cijevi.
Cijevi se međusobno spajaju mehaničkim spojnicama iznad prečnika DN50, a za DN50 i manje prečnike, spajanje je predviđeno pocinkovanim navojnim fitingom prema preporukama CEA 4001.
Cjevovodi se vode sa nagibom prema mjestima ispusta, kako bi se mogli isprazniti.Na krajevima magistralnih cjevovoda predviđene su slavine za ispiranje DN50.
Pad iznosi:

-0,4% za glavne cijevi
-0,2% za razvodne cjevovode

Način formiranja cjevne mreže ima direktan uticaj na uniformnost pokrivanja štićenog prostora. Praktični uslovi i mogućnosti odredili su raspored cjevne mreže i to u zavisnosti od konstrukcije i namjene objekta. Prema propisima i standardima, maksimalni dozvoljeni pritisak u cjevovodu ne sme da pređe vrednost od $p_{max.} = 12$ bar.

7. SPRINKLER MLAZNICE

Sprinkler mlaznice su važan elemenat sprinkler instalacije, jer vrše njeno aktiviranje. One se pri određenoj temperaturi otvaraju, a svojom konstrukcijom omogućavaju rasipanje vode tako da ona ravnomjerno kvasi površinu na kojoj se desio požar.

Sprinkler mlaznica se sastoji od sledećih delova:

- tijela mlaznice
- zatvarača kojeg na sjedištu drži ampula ispunjena ekspanzivnom tečnošću (ampula puca kada temperatura oko mlaznice dostigne vrednost od 68 ^{o}C)
- raspršivača učvršćenog na vrhu tijela mlaznice

Sprinkler mlaznice se postavljaju sa deflektorom mlaza okrenutim dole (viseća) i gore (stojeća).
Minimalno dozvoljeni pritisak na sprinkler mlaznici iznosi p_{min} = 0.35 bar.

8. NAČIN RADA INSTALACIJE

Cijevna mreža je postavljena tako tako da su mlaznice okrenute dole (viseća) i gore (stojeća, za dio objekta fiskulturna sala).
Cijela instalacija je napunjena vazduhom pod pritiskom (nizvodno od klapne sprinkler ventila), a vodom uzvodno od klapne sprinkler ventila.
Svaka mlaznica na svom izlaznom dijielu ima ampulu koja zatvara otvor.
Prilikom pojave temperature od 68°C, dolazi do pucanja ampule na mlaznici usled širenja ekspanzione tečnosti koja se nalazi u ampuli. Na taj način se otvara izlaz kroz koji izlazi vazduh iz sistema i nakon njega slijedi isticanje vode.
Voda udara u deflektor i raspršava se tako da u kružnoj lepezi pokriva površinu koja se štiti.
U slučaju da prvo aktivirana sprinkler mlaznica ne uspije da ugasi požar, pa se on proširi, otvaraju se sledeće sprinkler mlaznice u neposrednoj blizini mjesta požara.
Usled otvaranja mlaznice pada pritisak u gornjoj komori sprinkler ventila, podiže se klapna u sprinkler ventilu. Voda iz podstanice protiče ka sprinklerskim mlaznicama. Preko žleba u sjedištu sprinkler ventila voda ulazi u cjevovod prema hidrauličkom alarmnom zvonu.
Alarmno zvono se nalazi van pumpne stanice, na visini od oko 2 metra od kote poda.
Prilikom kretanja vode u cjevovodima, indikator protoka, daje impuls koji se prenosi na centralu za dojavu požara, a ona zatim daje alarmni signal da je instalacija proradila.

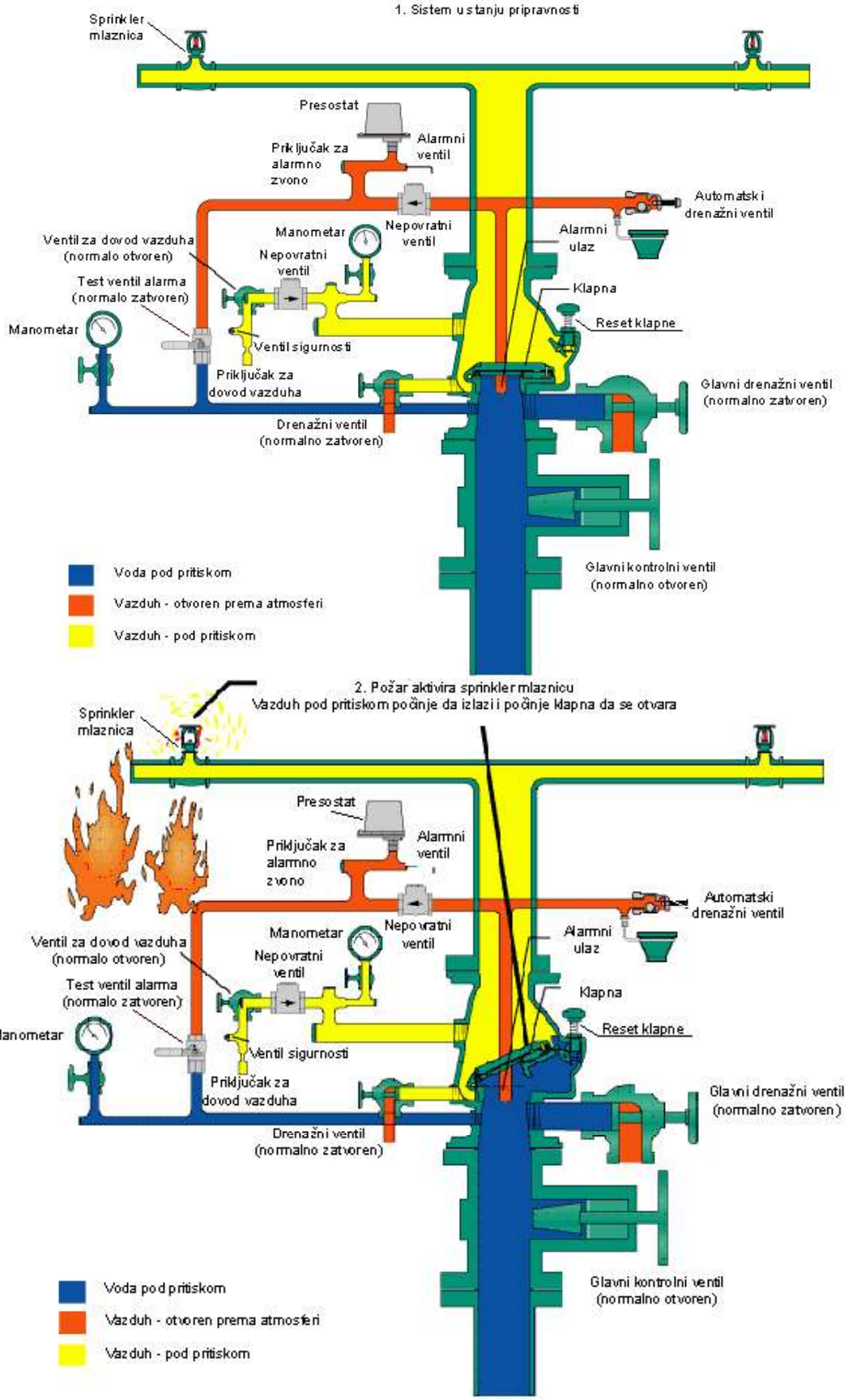
9. SNABDIJEVANJE VODOM SPRINKLER INSTALACIJE

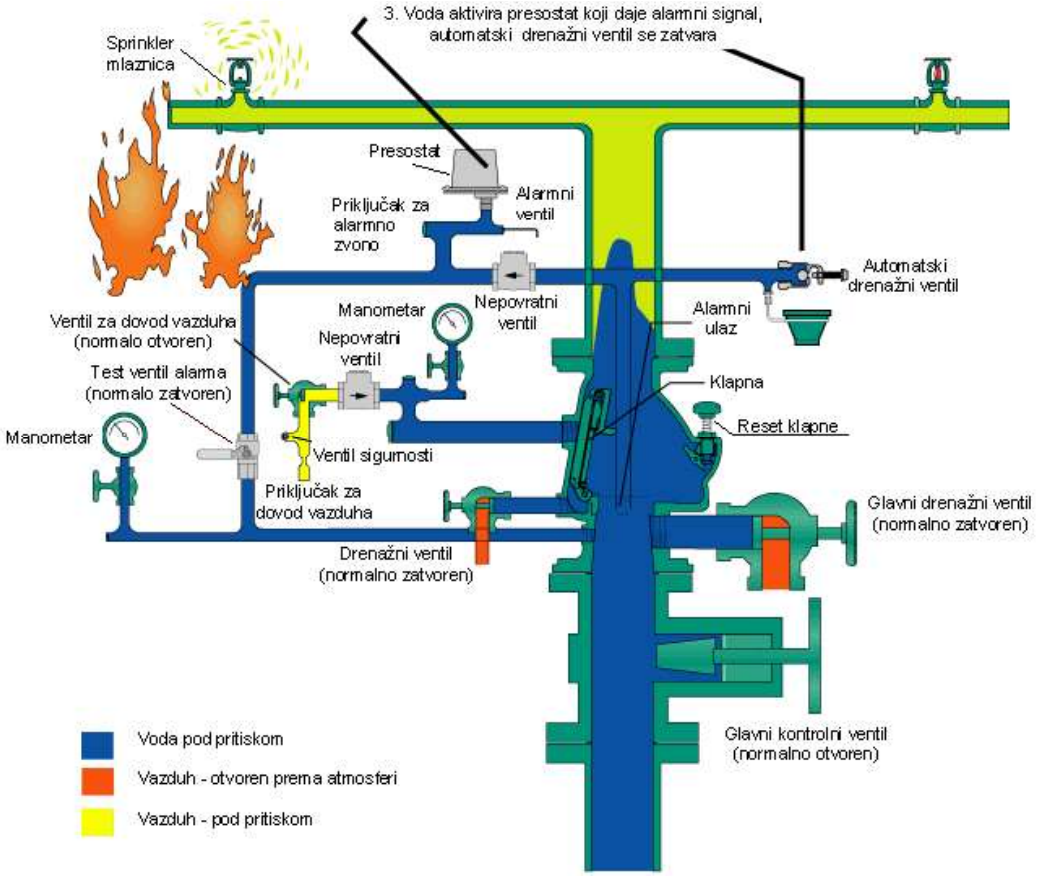
Za pravilan i siguran rad sprinkler instalacije najvažniju ulogu ima sigurno snabdijevanje vodom, dovoljne količine sa potrebnim pritiskom tokom vremena gašenja. Snabdijevanje vodom mora biti pouzdano i ne smije biti ugroženo niskim temperaturama.
Kao neiscrpni izvor vode za sprinkler instalaciju koristiti gradsku mrežu.

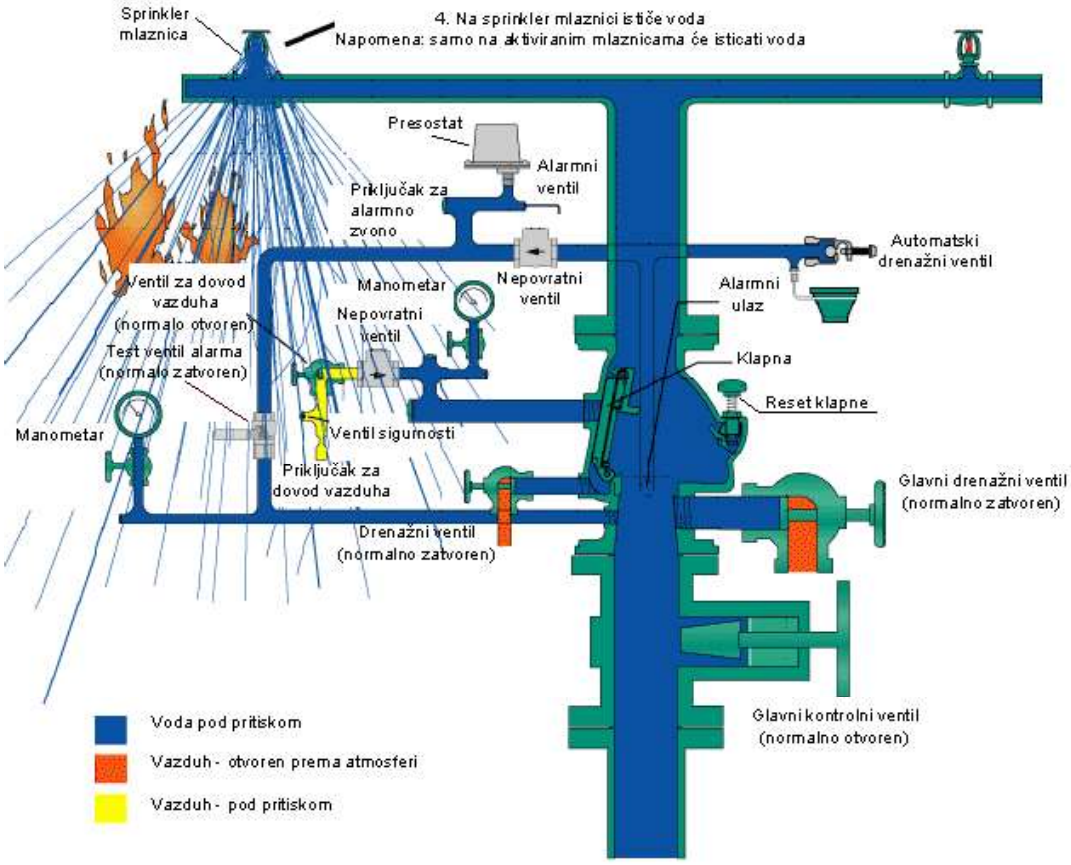
Odgovorni inženjer
Vuk Kasalica, dipl. ing. maš.

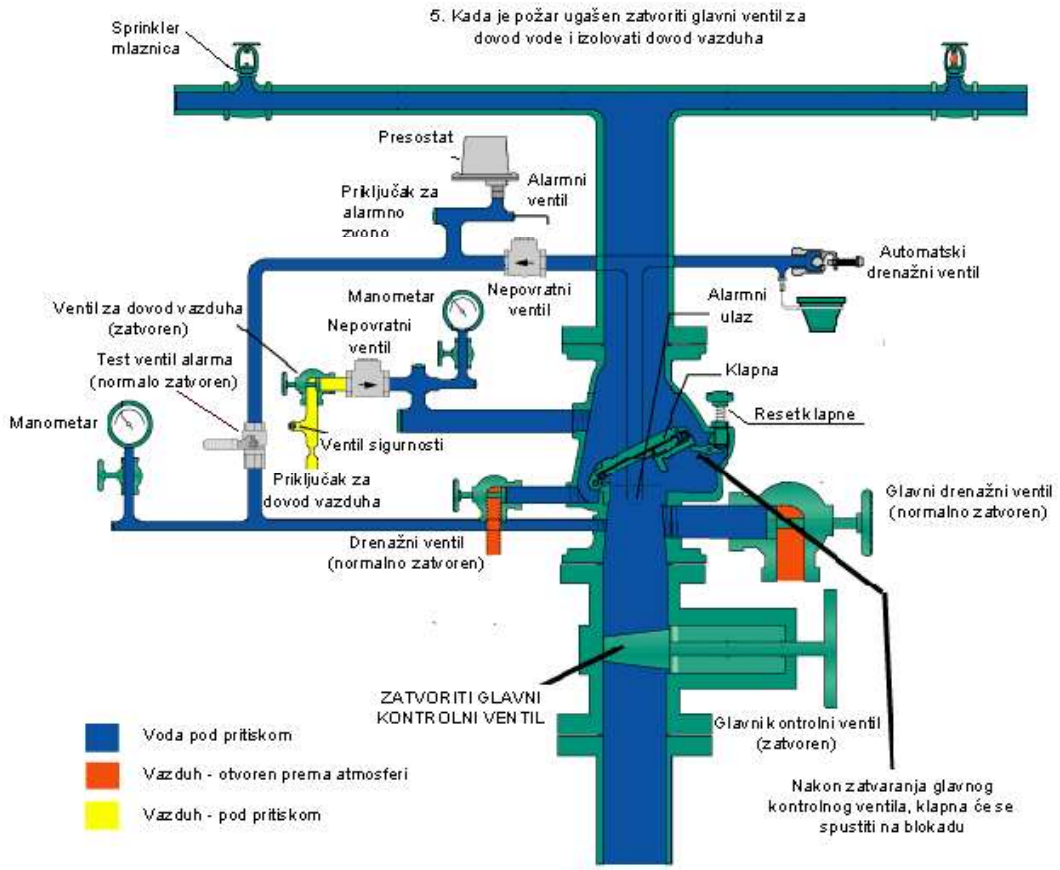
_____

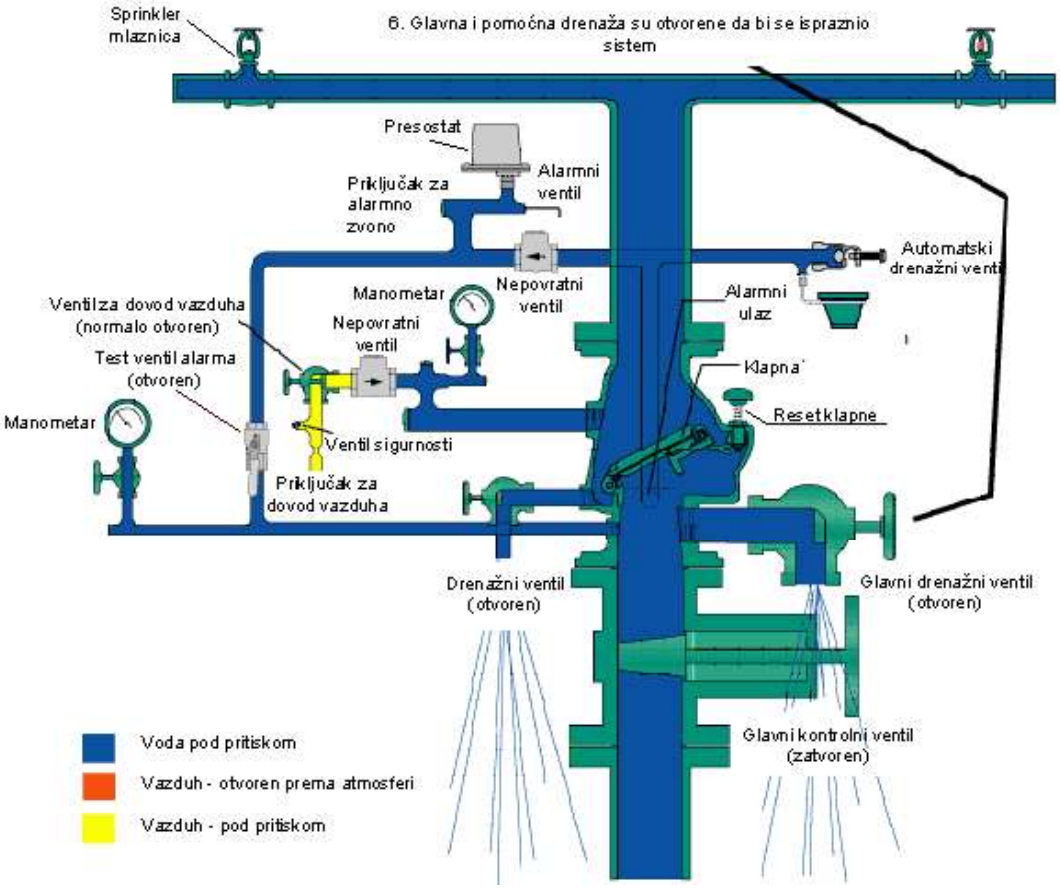
ŠEMATSKI PRIKAZ RADA SUVOG SPRINKLER VENTILA

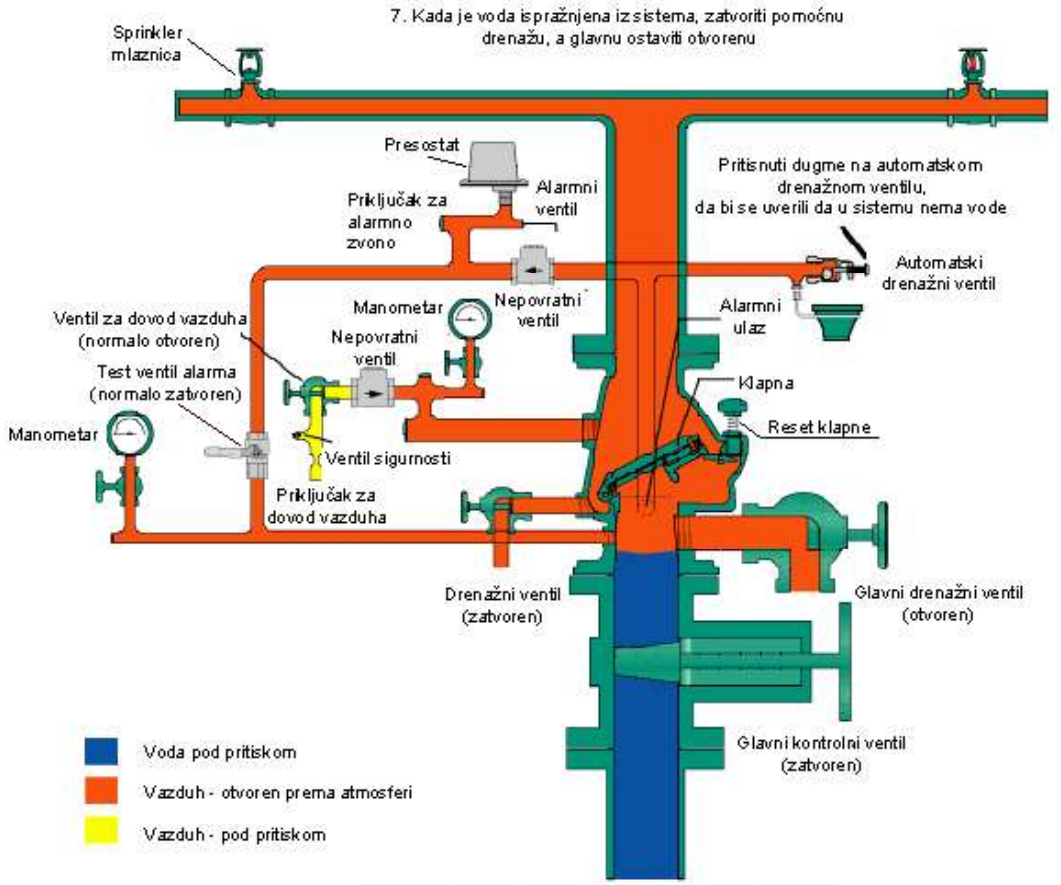



3. Voda aktivira presostat koji daje alarmni signal, automatski drenažni ventil se zatvara
Sprinkler mlaznica
Presostat
Alarmni ventil
Priključak za alarmno zvono
Automatski drenažni ventil
Nepovratni ventil
Manometar
Alarmni ulaz
Ventil za dovod vazduha (normalo otvoren)
Nepovratni ventil
Test ventil alarma (normalo zatvoren)
Klapna
Reset klapne
Manometar
Ventil sigurnosti
Priključak za dovod vazduha
Glavni drenažni ventil (normalno zatvoren)
Drenažni ventil (normalno zatvoren)
Glavni kontrolni ventil (normalno otvoren)
Voda pod pritiskom
Vazduh - otvoren prema atmosferi
Vazduh - pod pritiskom


4. Na sprinkler mlaznici ističe voda
Napomena: samo na aktiviranim mlaznicama će isticati voda
Sprinkler mlaznica
Presostat
Alarmni ventil
Priključak za alarmno zvono
Automatski drenažni ventil
Ventil za dovod vazduha (normalo otvoren)
Manometar
Nepovratni ventil
Alarmni ulaz
Nepovratni ventil
Test ventil alarma (normalo zatvoren)
Klapna
Reset klapne
Manometar
Ventil sigurnosti
Priključak za dovod vazduha
Glavni drenažni ventil (normalno zatvoren)
Drenažni ventil (normalno zatvoren)
Glavni kontrolni ventil (normalno otvoren)
Voda pod pritiskom
Vazduh - otvoren prema atmosferi
Vazduh - pod pritiskom


5. Kada je požar ugašen zatvoriti glavni ventil za dovod vode i izolovati dovod vazduha
Sprinkler mlaznica
Presostat
Priključak za alarmno zvono
Alarmni ventil
Automatski drenažni ventil
Nepovratni ventil
Manometar
Alarmni ulaz
Ventil za dovod vazduha (zatvoren)
Nepovratni ventil
Test ventil alarma (normalo zatvoren)
Klapna
Resetklapne
Manometar
Ventil sigurnosti
Priključak za dovod vazduha
Glavni drenažni ventil (normalno zatvoren)
Drenažni ventil (normalno zatvoren)
ZATVORITI GLAVNI KONTROLNI VENTIL
Glavni kontrolni ventil (zatvoren)
Voda pod pritiskom
Vazduh - otvoren prema atmosferi
Vazduh - pod pritiskom
Nakon zatvaranja glavnog kontrolnog ventila, klapna će se spustiti na blokadu


6. Glavna i pomoćna drenaža su otvorene da bi se ispraznio sistem
Sprinkler mlaznica
Presostat
Priključak za alarmno zvono
Alarmni ventil
Automatski drenažni venti
Nepovratni ventil
Manometar
Alarmni ulaz
Ventil za dovod vazduha (normalo otvoren)
Nepovratni ventil
Test ventil alarma (otvoren)
Klapna
Resetklapne
Manometar
Ventil sigurnosti
Priključak za dovod vazduha
Drenažni ventil (otvoren)
Glavni drenažni ventil (otvoren)
Glavni kontrolni ventil (zatvoren)
Voda pod pritiskom
Vazduh - otvoren prema atmosferi
Vazduh - pod pritiskom


7. Kada je voda ispražnjena iz sistema, zatvoriti pomoćnu drenažu, a glavnu ostaviti otvorenu
Sprinkler mlaznica
Presostat
Alarmni ventil
Priključak za alarmno zvono
Pritisnuti dugme na automatskom drenažnom ventilu, da bi se uverili da u sistemu nema vode
Automatski drenažni ventil
Manometar
Nepovratni ventil
Alarmni ulaz
Ventil za dovod vazduha (normalo otvoren)
Nepovratni ventil
Test ventil alarma (normalo zatvoren)
Klapna
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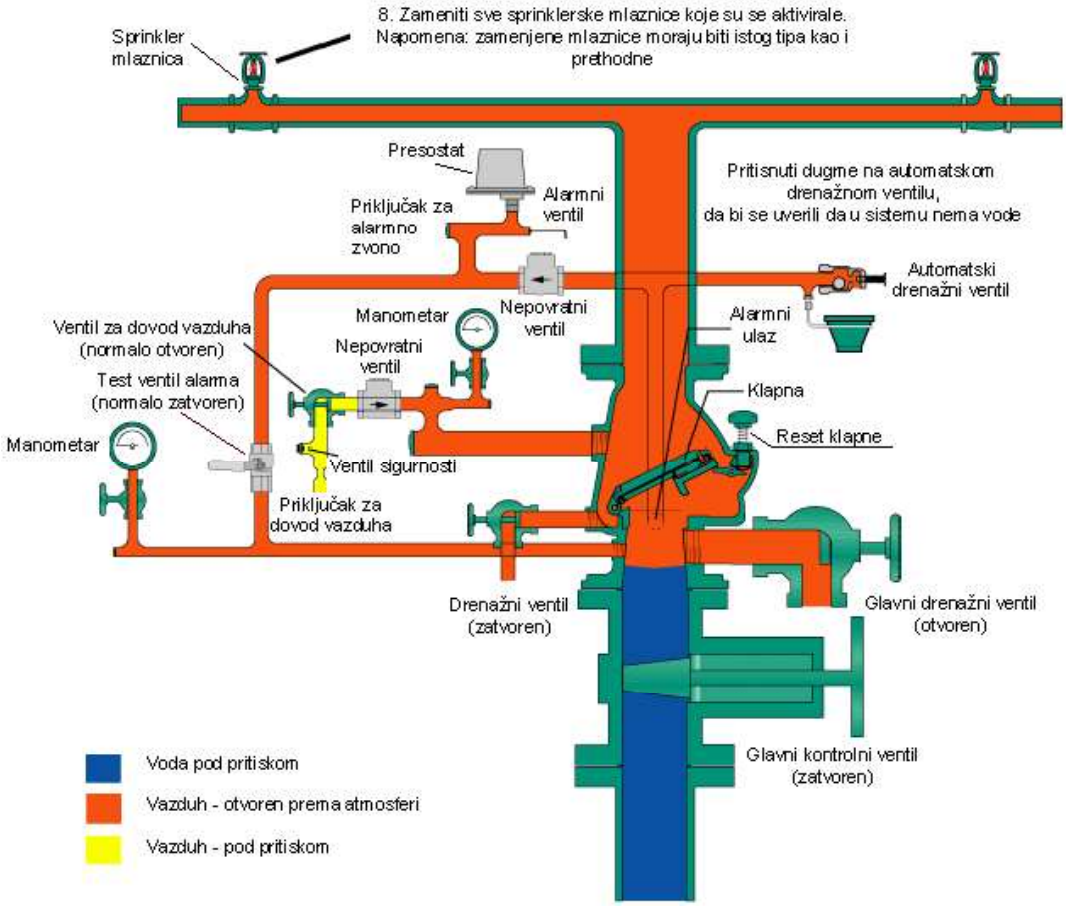
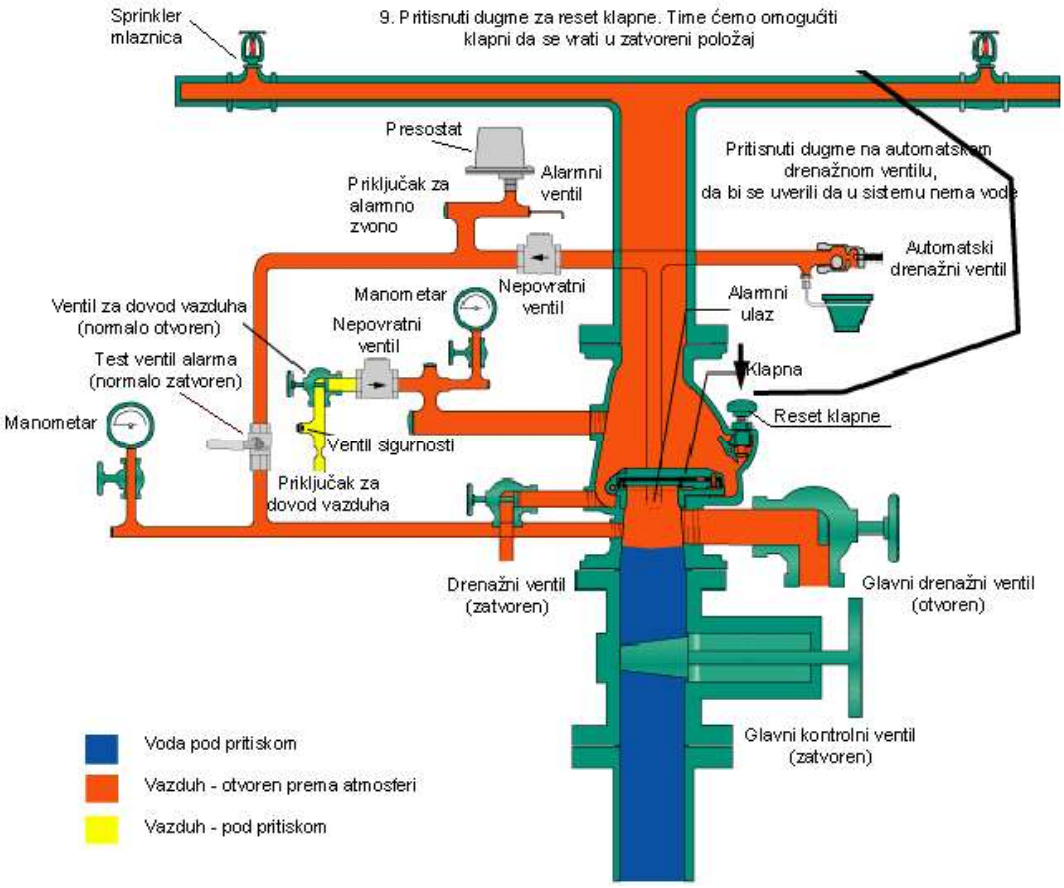
Manometar
Ventil sigurnosti
Priključak za dovod vazduha
Drenažni ventil (zatvoren)
Glavni drenažni ventil (otvoren)
Glavni kontrolni ventil (zatvoren)
Voda pod pritiskom
Vazduh - otvoren prema atmosferi
Vazduh - pod pritiskom


8. Zameniti sve sprinklerske mlaznice koje su se aktivirale. Napomena: zamenjene mlaznice moraju biti istog tipa kao i prethodne
Sprinkler mlaznica
Presostat
Alarmni ventil
Priključak za alarmno zvono
Pritisnuti dugme na automatskom drenažnom ventilu, da bi se uverili da u sistemu nema vode
Automatski drenažni ventil
Manometar
Nepovratni ventil
Alarmni ulaz
Ventil za dovod vazduha (normalo otvoren)
Nepovratni ventil
Test ventil alarma (normalo zatvoren)
Klapna
Reset klapne
Manometar
Ventil sigurnosti
Priključak za dovod vazduha
Drenažni ventil (zatvoren)
Glavni drenažni ventil (otvoren)
Glavni kontrolni ventil (zatvoren)
Voda pod pritiskom
Vazduh - otvoren prema atmosferi
Vazduh - pod pritiskom


Sprinkler mlaznica
9. Pritisnuti dugme za reset klapne. Time ćemo omogućiti klapni da se vrati u zatvoreni položaj
Presostat
Alarmni ventil
Priključak za alarmno zvono
Pritisnuti dugme na automatskom drenažnom ventilu, da bi se uverili da u sistemu nema vode
Automatski drenažni ventil
Nepovratni ventil
Manometar
Alarmni ulaz
Ventil za dovod vazduha (normalo otvoren)
Nepovratni ventil
Test ventil alarma (normalo zatvoren)
Klapna
Manometar
Reset klapne
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Priključak za dovod vazduha
Drenažni ventil (zatvoren)
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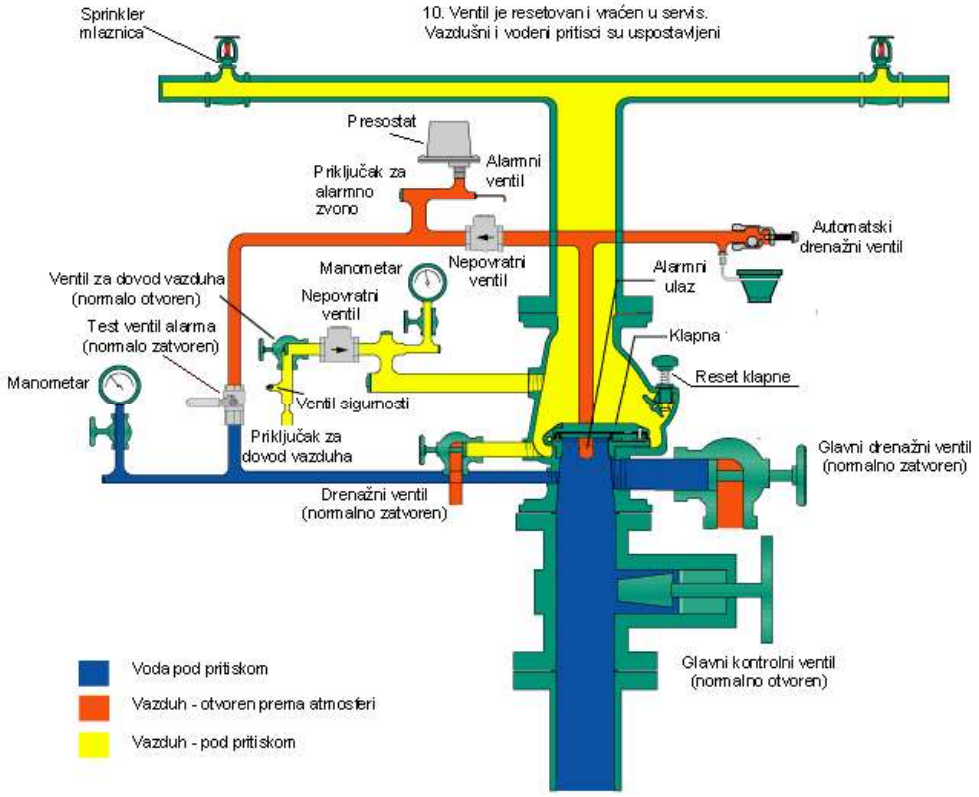
Glavni kontrolni ventil (zatvoren)
Voda pod pritiskom
Vazduh - otvoren prema atmosferi
Vazduh - pod pritiskom


Sprinkler mlaznica
10. Ventil je resetovan i vraćen u servis. Vazdušni i vodeni pritisci su uspostavljeni
Presostat
Alarmni ventil
Priključak za alarmno zvono
Automatski drenažni ventil
Nepovratni ventil
Manometar
Alarmni ulaz
Ventil za dovod vazduha (normalo otvoren)
Nepovratni ventil
Test ventil alarma (normalo zatvoren)
Klapna
Manometar
Reset klapne
Ventil sigurnosti
Priključak za dovod vazduha
Glavni drenažni ventil (normalno zatvoren)
Drenažni ventil (normalno zatvoren)
Glavni kontrolni ventil (normalno otvoren)
Voda pod pritiskom
Vazduh - otvoren prema atmosferi
Vazduh - pod pritiskom

1.2 PROGRAM KONTROLE I OSIGURANJA KVALITETA

OPŠTI USLOVI

1. Prije ustupanja izgradnje investitor utvrđuje podobnost izvođača radova, a zatim ustupa izgradnju objekta nadmetanjem, prikupljanjem ponuda ili neposrednom pogodbom.
2. Investitor i izvođač radova zaključuju Ugovor o izvođenju radova, koji sadrži sledeće:
   - rok početka i rok završetka radova,
   - način naplate izvršenih radova i ugovorene penale,
   - garantni rok,
   - nadzor investitora nad izvođenjem postrojenja,
   - obaveze izvođača da postrojenje izradi prema odobrenom projektu i u skladu sa postojećim standardima, tehničkim uputstvima i normama.

3. Izgradnja se može započeti tek kada investitor pribavi odobrenje za izgradnju objekta.
4. Investitor je dužan da izvođača radova uvede u posao, što naročito obuhvata:
   - predaju gradilišta i prava pristupa gradilištu;
   - obezbeđenje priključaka za struju i vodu, goriva i sl.
   - predaju tehničke dokumentacije;
   - predaju odobrenja za izgradnju objekta;
   - obezbeđenje sredstava za finansiranje izgradnje objekta i plaćanje obaveza, sa pružanjem dokaza o tome.

5. O uvođenju izvođača radova u posao sastavlja se poseban zapisnik i to se konstatuje u građevinskom dnevniku.
6. Izvođač radova vodi na propisan način građevinski dnevnik i građevinsku knjigu, u koje unosi podatke o toku i načinu izgradnje objekta.
7. Izvođač radova prijavljuje gradilište organu uprave, nadležnom za poslove građevinske inspekcije, najmanje 8 dana prije namjeravanog početka izvođenja radova.
8. Izvođač radova je dužan da blagovremeno i detaljno prouči projekat na osnovu koga se izvode ugovoreni radovi i, saglasno pravilima struke, ispita pravilnost tehničkih rešenja.
9. Investitor je dužan da izvođaču pruži tražena objašnjenja o nedovoljno jasnim detaljima tehničke dokumentacije.
10. Izvođač radova nema pravo da mijenja tehničku dokumentaciju. Ako uoči nedostatke u njoj, dužan je da o tome blagovremeno obavijesti investitora.
11. Tehnička dokumentacija može da se mijenja samo uz pristanak investitora i projektanta.
12. Izvođač radova je dužan da pregleda objekat i utvrdi da li su i kako su prema projektu izvedeni svi građevinski radovi, koji su u vezi sa izvođenjem ove instalacije.
13. Ukoliko postoje znatna odstupanja, izvođač je dužan da nedostatke pismeno prijavi investitoru i da traži od investitora prilagođenje projekta.
14. Izvođač radova u toku radova treba:
   - da izvodi radove prema tehničkim propisima, normativima i standardima, koji važe za predmetne instalacije;
   - da ugrađuje materijal koji odgovara propisanim standardima, odnosno koji ima atest izdat od strane stručne organizacije ovlašćene za ispitivanje tog materijala da blagovremeno preduzima mjere za sigurnost objekta, radova, opreme, uređaja i instalacija, radnika, prolaznika, saobraćajnih sredstava, susjednih objekata i okoline;
   - da se pridržava projekata na osnovu kojih je izdato odobrenje za izgradnju objekta;
   - da uredno održava gradilište;

- da svojom kontrolom obezbijedi da se radovi izvode u skladu sa ovim zahtjevima, kako bi se izbjegle štetne posledice, koje se mogu javiti usled nepravilnosti pri izgradnji objekta.

15. Izvođač je dužan da upozori investitora na uočene/utvrđene nedostatke materijala i opreme koji su predvođeni projektom, kao i materijala i opreme koju je investitor nabavio/odabrao.
16. Izvođač je dužan da pruži dokaze o kvalitetu upotrebljenog materijala, opreme i izvedenih radova, kao i da investitoru omogući kontrolu.
17. U toku izvođenja radova izvođač je dužan da primijećene nedostatke otkloni u datom roku.
18. Ugovarač je dužan da blagovremeno obavijesti drugog ugovarača o okolnostima od uticaja na ispunjenje ugovora.
19. Za sve naknadne i nepredviđene radove koji nijesu ugovoreni, a investitor zahtijeva da se izvedu, izvođač će podneti dopunsku ponudu, posle čijeg prihvatanja se radovi mogu izvoditi.
20. Stručni nadzor investitora:

- investitor vrši stručni nadzor nad radovima izvođača radi provjeravanja i obezbjeđenja njihovog urednog obavljanja, naročito u pogledu vrsta, količina i kvaliteta radova, materijala i opreme i previđenih rokova;
- stručni nadzor vrši lice koje investitor odredi za nadzornog organa, pri čemu o njegovim ovlašćenjima obavještava izvođača;
- izvođač je dužan da investitoru omogući vršenje stručnog nadzora;
  sve primjedbe nadzornog organa saopštavaju se u pismenoj formi, preko dnevnika.

21. Osiguranje, uskladištenje i čuvanje opreme i materijala:

- izvođač radova snosi troškove osiguranja opreme, materijala i radova od uobičajenih rizika, do njihove vrednosti;
- izvođač je dužan da opremu i materijal uskladišti, čuva i održava do ugrađivanja;
- izvođač snosi troškove obezbjeđenja i čuvanja izvedenih radova i ugrađene opreme i materijala i rizik njihovog oštećenja, uništenja, odnošenja i propadanja.

22. Pripremni i završni radovi:

- izvođač je dužan da o svom trošku organizuje gradilište, izgradi privremene objekte za smeštaj opreme, materijala, alata, radionice i radne snage, kao i da obezbijedi potrebnu mehanizaciju i prevoz radnika i sl.
- izvođač je dužan da o svom trošku preda investitoru projekat izvedenih radova, koji obuhvata sve izmjene i dopune koje su uslijedile u toku izvođenja radova, u broju primjeraka prema ugovoru;
- po definitivno izvedenim radovima, izvođač je dužan da o svom trošku izradi šeme i uputstva za rukovanje i održavanje cijele instalacije ili postrojenja, koji su ovjereni od strane projektanta, i da ih preda investitoru, u broju primjeraka prema ugovoru;
- po završenim radovima izvođač je dužan da o svom trošku povuče svoje radnike sa gradilišta, ukloni preostali materijal, opremu i sredstva za rad, kao i privremene objekte koje je sagradio i očisti objekat i gradilište.

23.Garancija za kvalitet radova

- garantni rok za izvedene radove iznosi 2 (dve) godine, ako ugovorom nije drugačije određeno;
- izvođač garantuje da su izvedeni radovi, u vrijeme primopredaje, u skladu sa ugovorom, propisima i pravilima struke, i da nemaju mana koje umanjuju njihovu vrijednost ili podobnost za redovnu upotrebu, odnosno namjenu;
- garantni rok počinje da teče od dana primopredaje izvedenih radova;
- za ugrađenu opremu važi garancija proizvođača opreme, s tim što je izvođač dužan da svu dokumentaciju o garancijama, zajedno sa uputstvima za upotrebu, pribavi i preda investitoru. Ako je investitor nabavio opremu, dužan je da sam pribavi navedenu dokumentaciju za nju;
- u toku garantnog roka izvođač je dužan da o svom trošku otkloni u primjerenom roku sve nedostatke koji su nastupili usled toga što se izvođač nije pridržavao svojih obaveza u pogledu kvaliteta radova i materijala;

- ako izvođač ne otkloni nedostatke u primjerenom roku koji mu investitor odredi, investitor može to da povjeri drugom na račun izvođača radova;
- izvođač nije dužan da otkloni one nedostatke koji su nastali kao posledica nestručnog rukovanja i upotrebe, odnosno nenamjenskog korišćenja instalacije.

24. Primopredaja i konačni obračun izvedenih radova

- po završetku radova izvođač obaveštava investitora da su radovi koji čine predmet ugovora završeni;
- na zahtjev investitora ili izvođača radova, nadležni organ formira komisiju za tehnički pregled izvedenih radova;
- po obavljenom tehničkom pregledu, nadležni organ donosi rešenje o upotrebi objekta, a zatim se pristupa primopredaji objekta i izvedenih radova;
- po primopredaji izvedenih radova vrši se konačni obračun, kojim se raspravljaju odnosi između investitora i izvođača radova i utvrđuje izvršenje međusobnih obaveza;
- konačnim obračunom se obuhvataju svi radovi izvedeni na osnovu ugovora,

uključujući viškove i manjkove radova, kao i nepredviđene i naknadne radove;
svaki ugovarač snosi troškove svog učešća u izradi konačnog obračuna.

Ovi pogodbeni uslovi su sastavni deo glavnog projekta i u svemu su obavezni za izvođača radova, sem ukoliko nije drugačije regulisano ugovorom između investitora i izvođača.

25. Svi ostali odnosi između investitora i izvođača radova regulišu se ugovorom.

TEHNIČKI USLOVI ZA SPRINKLERSKE INSTALACIJE

UPUTSTVO ZA IZVOĐENJE

1. Cijelu instalaciju treba montirati prema ovom projektu po dobijanju saglasnosti od nadležnog organa.
2. Sve cijevi, nosače cevovoda i opremu prije montaže treba besprekorno očistiti i zaštititi osnovnom bojom.
3. Proveriti nečistoću cijevi i sa unutrašnje strane, te ukoliko nijesu dovoljno čiste, očistiti ih čeličnom četkom.
4. Svi elementi cijevi, armatura i druga oprema prije ugradnje treba da posjeduje atestiranu dokumentaciju i to cijevi na 16 bara, a armaturu na 10 bara.
5. Spajanje cjevovoda vršiti zavarivanjem i navojnim spojevima.
6. Posle završetka kompletne montaže izvršiti probu instalacije na hidraulični pritisak. Instalaciju treba ispitati na pritisak veći za 50% od radnog pritiska.
7. Probu na traženi pritisak obaviti na sledeći način:
   Cijevna mreža je zatvorena sa šprinkler mlaznicama, a na drugom kraju zatvoriti ventil za dovod vode iz mreže.
   - Mrežu napuniti vodom i ozračiti.
   - Ručnom pumpom ostvariti pritisak od 15 bar ili 50% veći od radnog pritiska, koji god od ta dva bude veći. Ovaj pritisak držati 24 časa i kontrolisati eventualne padove pritiska.

   Instalacija je zadovoljila hidrauličnu probu kada u traženom vremenu od 24 časa nije došlo do pada pritiska.
8. Po završetku probe obavezno napraviti zapisnik koji se čuva kao trajni dokument.
9. Posle završene montaže i probe instalacije na hidraulični pritisak, instalaciju ofarbati završnom bojom.
10. Na vidnom mjestu postaviti tablicu sa nadpisom firme izvođača sa godinom montaže.

PROBNI RAD, ODRŽAVANJE, NAČIN ISPITIVANJA I POVREMENA KONTROLA ISPRAVNOSTI INSTALACIJE

1. Po završetku montaže i ispitivanja instalacije na hidraulički pritisak treba izvršiti funkcionalnu probu.
2. Funkcionalnu probu vršiti uz prisustvo prestavnika investitora i prestavnika izvođača radova. Predstavnik investitora treba da bude nadzorni organ, a predstavnik izvođača radova šef gradilišta.
   Probu uređaja izvršiti na sledeći način:
   - potpaljivanjem sprinkler mlaznice,
   - otvaranjem ventila za probu na ventilskoj stanici.

   U prvom slučaju prilikom probe treba da se postigne sledeće:
   a) isticanje vode na sprinkler mlaznici u raspršenom stanju,
   b) za par desetina sekundi oglašavanje hidrauličkog zvona i slanja u glavni komandni centar,
   c) da je uređaj aktiviran,

   U drugom slučaju otvaranjem ventila za probu na ventilskoj stanici treba da se postigne sledeće:
   Ponavljaju se stavke a), b), i c) u prethodom slučaju.
3. Posle izvršene probe sačiniti zapisnik koji će potpisati ovlašćena lica i čuvati kao trajni dokument. Zapisnik dostaviti na uvid tehničkoj komisiji za prijem.
4. Kada je završeno gašenje onda se uređaj stavlja u mobilno stanje. Prvo se isključuje kompresor, zatim se zatvara dovodni ventil, zamenjuje se sprinkler mlaznica, a zatim se voda ispušta iz mreže. Kada je mreža prazna, onda se sprinkler stanica - sprinkler ventil dovodi u ravnotežni položaj. Zatim se uključuje kompresor za održavanje pritiska vazduha u cevovodu nizvodno od klapne sprinkler ventila.
5. Periodični pregledi obavljaju se u određenim vremenskim razmacima, a odnose se na sledeće:
   - proba funkcionalnosti,
   - čišćenje instalacije od eventualnih nečistoća,
   - zamjena ventila ili spoja koji curi,
   - čišćenje staklenih ampula na sprinkler mlaznicama.
6. Proba funkcionalnosti kompletnog sistema vrši se na period do jedne godine i to sve u funkciji ostalog održavanja.

ČIŠĆENJE INSTALACIJE

1. Važno je da voda u instalaciji bude čista (bez mehaničkih nečistoća) kako ne bi došlo do začepljenja klapni i dr.
2. Čišćenje instalacije obaviti godišnje.
3. Sve ventile podmazati i spojeve koji cure dotegnuti i prekontrolisati.
4. Staklene ampule obavezno očistiti od prljavštine jednom u tri meseca.

PRILOG SA UPUTSTVOM ZA KORIŠĆENJE I ODRŽAVANJE OPREME

UPUTSTVO ZA RUKOVANJE I ODRŽAVANJE

A. STARTOVANJE UREĐAJA U RAD

a) Zatvoriti glavni kontrolni ventil.
b) Uključiti kompresor i napuniti cevovod vazduhom (pritisak vazduha mora biti po preporuci proizvođača sprinkler suvog ventila).
c) Pritisnuti dugme "reset klapne".
d) Proveriti pritisak na manometrima otvaranjem njihovih ventila.
e) Otvoriti glavni kontrolni ventil.

Napomena: svi drenažni i test ventili moraju biti zatvoreni.

B. DOVOĐENJE UREĐAJA U ISPRAVNOST NAKON POŽARA

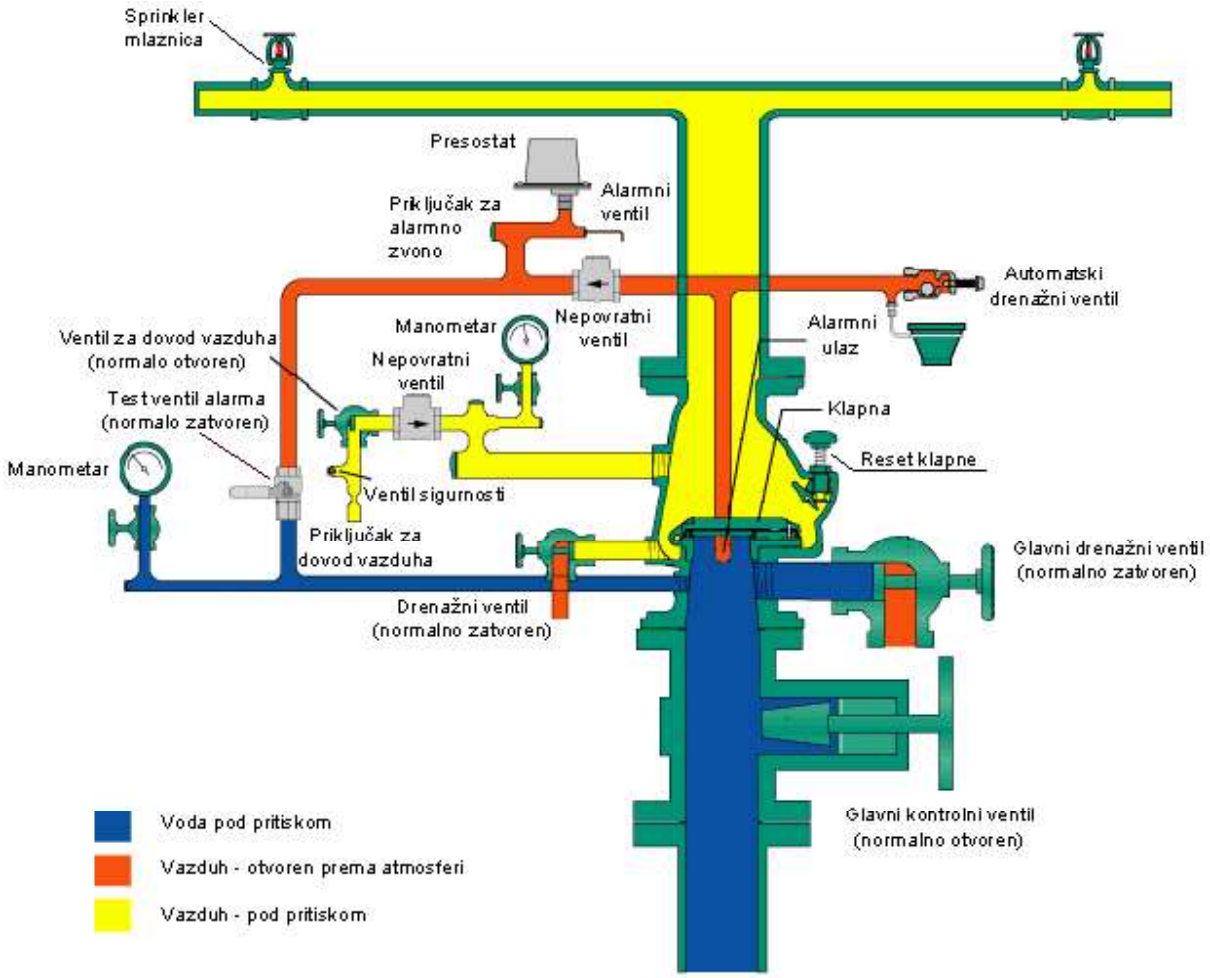
a) Zatvoriti glavni kontrolni ventil.
b) Isključiti kompresor.
c) Ispustiti vodu otvaranjem svih drenažnih ventila.
d) Zatvoriti drenažni ventil, ali glavni drenažni ventil ostaviti otvoren.
e) Zameniti aktivirane sprinkler mlaznice, mlaznicama istog tipa.
f) Pritisnuti dugne za reset klapne.
g) Zatvoriti glavni drenažni ventil.
h) Uključiti kompresor i napuniti cevovod vazduhom (pritisak vazduha mora biti po preporuci proizvođača sprinkler suvog ventila)
i) Otvoriti glavni kontrolni ventil.

C. U SLUČAJU LAŽNOG AKTIVIRANJA

Procedura je ista kao i za "dovođenje uređaja u ispravnost nakon požara", ali treba izostaviti poziciju e), zato što se ni jedna mlaznica neće aktivirati u slučaju lažnog aktiviranja.

D. PROVERA ALARMIRANJA

a) Otvoriti test ventil alarma.
b) Posle nekoliko sekundi će se oglasiti alarm.
c) Pustiti alarm da radi minimum 30 sekundi.
d) Zatvoriti test ventil alarma.



E. OSTALE MJERE ODRŽAVANJA

Svakodnevno kontrolisati:

- Otvorenost ventila Poz.1 i Poz.5
- Pritisak ispred i iza šprinkler ventila na manometrima.

Nedjeljno kontrolisati:

- Probni alarm na svakoj alarmnoj stanici sa kontrolom mehaničkih i električnih alarmnih uređaja.
- Pozicija spremna za rad na svim armaturama za zatvaranje
- Sposobnost funkcionisanja automatskih i ručnih uređaja za startovanje pumpi

Mjesečno kontrolisati:

- Funkcionalna spremnost pumpi i njihovih motora. Pumpni agregat treba da se podvrgne probnom radu pri nazivnom kapacitetu u trajanju od 15 minuta.
- Funkcionalna spremnost automatike dizel agregata
- Funkcionalna proba kontrolnih uređaja
- Stanje mreže cjevovoda

Polugodišnje:

- Pregled cjelokupnog uređaja od strane ovlašćene institucije
- Ventilske sprinkler stanice
- Otvaranje i zatvaranje svih ventila

Svake godine kontrolisati:

- Pregled alarmnog ventila
- Čišćenje filtera i otvora
- Podmazivanje alarmnog zvona.
  Stanje rezervoara

Svake druge godine kontrolisati:

- Demontirati sve ventile, zasune i alarmni ventil i pregledati ih
- Izvršiti probno aktiviranje uređaja isceniranjem požara ispod sprinklera.

Posle dvadeset pet godina:

- Kontrola cjelokupne mreže cjevovoda. Izvršiti probu razvodne mreže hladnim vodenim pritiskom od 15 bara u trajanju od 24 časa.

Odgovorni inženjer
Vuk Kasalica, dipl. ing. maš.

1.3 UPUTSTVO ZA UPRAVLJANJE GRAĐEVINSKIM OTPADOM, ODNOSNO OPASNIM OTPADOM KOJI NASTAJE TOKOM GRAĐENJA, KORIŠĆENJA ODNOSNO UKLANJANJANJA OBJEKTA, U SKLADU SA POSEBNIM PROPISOM

U skladu sa članom 26, 27, 28 Zakona o upravljanju otpadom (Sl.list CG br. 64/11 od 29.12.2011. godine), Investitor je u obavezi da Agenciji za zaštitu životne sredine, kao nadležnom organu, podnese zahtjev za davanje saglasnosti na
Plan upravljanja otpadom.

Član 27 Zakona o upravljanju otpadom propisuje sadržaj plana i to:

- vrstu, količinu i mjesto nastanka pojedinih vrsta otpada na godišnjem nivou, u skladu sa katalogom otpada,
- period tokom kojeg će se obavljati postupak ili aktivnosti koje kao rezultat imaju proizvodnju otpada,
- mjere za sprječavanje proizvodnje otpada ili smanjenje količina otpada i njegovog negativnog uticaja na životnu sredinu,
- način upravljanja otpadom, koji naročito obuhvata sakupljanje, privremeno skladištenje (lokacija), transport i obradu otpada.

Plan se radi na period od 3 godine shodno Zakonu o upravljanju otpadom („Sl.list CG" broj 64/11) nakon čega se radi drugi plan. Plan upravljanja otpadom stupa na snagu danom usvajanja od strane Agencije za zaštitu životne sredine Crne Gore.

Građevinski otpad nastaje prilikom izrade građevinskih proizvoda ili poluproizvoda, gradnje, rušenja I rekonstrukcije objekata.
Materijali koji se javljaju u građevinskom otpadu zavise od radova koji se izvode i mogu biti:
- zemljani radovi / iskop tla – zemlja, pijesak, šljunak, glina, ilovača, kamen;
- niskogradnja - bitumen (asfalt) ili cementom vezani materijal, pijesak, šljunak, drobljeni kamen;
- visokogradnja – beton, opeka, gips, plinobeton, prirodni kamen;
- miješani građevinski otpad – drvo, plastika, papir, karton, metal, kablovi, boje i lakovi, šut.

Sastav građevinskog otpada zavisi od toga da li se ruši postojeći ili gradi novi objekat, kao i od područja gdje se gradi – pored opeke i betona koji su sve više zastupljeni u savremenoj gradnji, na jugu Crne Gore kao građevinski materijal više je zastupljen kamen, a na sjeveru drvo.

Vrste građevinskog otpada sadržane su u Pravilniku o vrstama i metodama ispitivanja otpada u okviru indeksa 17. i čine ga građevinski otpad i otpad nastao rušenjem (uključujući i iskopano zemljište sa kontaminiranih lokacija):

17 01 Beton, cigla, pločice i keramika
17 01 01 beton
17 01 02 cigle
17 01 03 pločice i keramika
17 01 06*mješavina ili pojedine frakcije betona, cigle, pločice i keramika koji sadrže opasne supstance
17 01 07 mješavine ili pojedine frakcije betona, cigle, pločice i keramika drugačiji od 17 01 06*
17 02 Drvo, staklo i plastika
17 02 01 drvo
17 02 02 staklo
17 02 03 plastika

17 02 04* staklo, plastika i drvo koji sadrže opasne supstance ili su kontaminirani opasnim supstancama

17 03 Bituminozna mješavina , katran i proizvodi sa katranom
17 03 01*bituminozna mješavina koja sadrži katran od uglja
17 03 02 bituminozne mješavine drugačije od 17 03 01*
17 03 03*katran od uglja i proizvodi sa katranom

17 04 Metali (ukljucujući i njihove legure)
17 04 01 bakar, bronza,mesing
17 04 02 aluminijum
17 04 03 olovo
17 04 04 cink
17 04 05 gvožđe i čelik
17 04 06 kalaj
17 04 07 miješani metali
17 04 09* otpad od metala kontaminiran opasnim supstancama
17 04 10* kablovi koji sadrže ulje, katran od uglja i druge opasne supstance
17 04 11 kablovi drugačiji od 17 04 10*

17 05 Zemljište (ukljucujući zemljište sa kontaminiranih lokacija), kamen i muljeviti otpad iskopan bagerom
17 05 03*zemljište i kamen koji sadrže opasne supstance
17 05 04 zemljište i kamen drugačiji od 17 05 03*
17 05 05*muljeviti otpad iskopan bagerom koji sadrži opasne supstance
17 05 06 muljeviti otpad iskopan bagerom drugačiji od 17 05 05*
17 05 07* otpad koji spada sa gusjenica koji sadrži opasne supstance
17 05 08 otpad koji spada sa gusjenica drugačiji od 17 05 07*

17 06 Izolacioni materijali i građevinski materijali koji sadrže azbest
17 06 01* izolacioni materijali koji sadrže azbest
17 06 03* ostali izolacioni materijal koji se sastoji od ili sadrži opasne supstance
17 06 04 izolacioni materijali drugačiji od 17 06 01* i 17 06 03*
17 06 05* građevinski materijali koji sadrže azbest

17 08 Gradjevinski materijal na bazi gipsa
17 08 01* građevinski materijal na bazi gipsa kontaminiran opasnim supstancama
17 08 02 građevinski materijal na bazi gipsa drugačiji od 17 08 01*

17 09 Ostali otpad od gradjenja i rušenja
17 08 01*otpad od građenja i rušenja koji sadrži živu
17 08 02*otpad od građenja i rušenja koji sadrži PCB (npr. zaptivači koji sadrže PCB, podovi na bazi smola koji sadrže PCB, glazure koje sadrže PCB i kondenzatori koji sadrže PCB)
17 08 03*ostali otpad od građenja i rušenja (uključujući miješane otpade) koji sadrži opasne supstance
17 08 04 miješani otpad od građenja i rušenja drugačiji od 17
09 01*, 17 09 02* i 17 09 03*
Opasni otpad u katalogu otpada klasifikuje se prema kategoriji, tipu opasnog otpada, koji se određuje na osnovu
svojstava otpada ili dijela djelatnosti u kojima nastaje otpad u skladu sa Prilogom 2 pravilnika. U katalogu otpada opasni otpad označava se sa (*).
Obrada otpada obuhvata postupke prerade i odstranjivanja otpada.

Prerada otpada vrši se prema postupcima datim u Prilogu 5 pravilnika.
Odstranjivanje otpada vrši se prema postupcima datim u Prilogu 6 pravilnika.

POSTUPCI PRERADE OTPADA

Postupci prerade otpada kojima se obezbjeđuje da odloženi otpad ne ugrožava zdravlje ljudi i životnu sredinu su:
R1 - Korišćenje otpada kao goriva ili na drugi način za proizvodnju energije (*);
R2 -Prerada/regeneracija rastvarača;
R3 -Recikliranje/prerada organskih supstanci koje se ne koriste kao rastvarači (uključ uju či kompostiranje i druge načine biološke obrade);
R4 -Recikliranje/prerada metala i jedinjenja metala;
R5 -Recikliranje/prerada ostalih neorganskih materija ;
R6 -Regeneracija kisjelina ili baza;
R7 -Procesuiranje komponenata koje se koriste za ublažavanje zagađenja;
R8 -Procesuiranje komponenata katalizatora;
R9 -Ponovno rafinisanje korišćenog ulja ili drugo ponovno korišćenje prethodno koriš ćenog ulja;
R10 -Izlaganje otpada procesima u zemljištu koji daju korist za poljoprivredu ili ekološki napredak;
R11 -Korišćenje ostataka dobijenih bilo kojom operacijom pod brojevima R1 do R10;
R12 -Razmjena otpada za podvrgavanje bilo koje od operacija pod brojevima R1 do R11 ;
R13 - Skladištenje otpada namijenjenog za bilo koju operaciju od R1 do R12 (isklju čujući privremena skladištenja na mjestima gdje je otpad proizveden radi sakupljanja otpada).

POSTUPCI ODSTRANjIVANjA OTPADA

Postupci odstranjivanja otpada odstranjivanja kojima se obezbjeđuje da odstranjeni otpad ne ugrožava zdravlje ljudi i životnu sredinu su:

D1- Odlaganje u zemljištu ili na zemljištu (npr. deponije);
D2 -Izlaganje procesima u zemljištu (npr. biodegradacija tečnosti ili taložnih otpada u zemljištu);
D3 -Duboko ubrizgavanje (npr. ubrizgavanje otpada koji se mogu pumpati u bunare, slane kupole prirodnih depoa);
D4 -Površinsko zatvaranje (npr. stavljanje tečnih ili taložnih otpada u jame, basene ili lagune);
D5 -Posebno projektovane deponije (npr. stavljanje u linearno poređane zasebne ćelije koje su poklopljene i međusobno izolovane i izolovane od životne sredine);
D6 -Ispuštanje u vodu, osim u mora, odnosno okeane ;
D7 -Ispuštanje u mora, odnosno okeane, uključujući umetanje u morsko dno ;
D8 -Biološki tretman koji nije naznačen u ovoj listi, a dovodi do nastanka konačnih jedinjenja ili mješavinama koje
se odbacuju bilo kojom od operacija od D1 do D7 i D9 do D12;
D9 - Fizičko-hemijska obrada koja nije naznačena u ovoj listi, a dovodi do nastanka konačnih jedinjenja ili mješavinama koje se odbacuju bilo kojom od operacija od D1 do D8i D10 do D12 (npr. isparavanje,sušenje, kalcinacija) ;
D10 - Spaljivanje na tlu ;
D11 - Spaljivanje na moru;
D12 - Trajno skladištenje (npr. smještanje kontejnera u rudnik);
D13 -Miješanje i sjedinjavanje prije podvrgavanja bilo kojoj od operacija od D1 do D12;
D14 - Prepakivanje prije podvrgavanja bilo kojoj od operacija od D1 do D13;
D15 - Skladištenje koje prethodi bilo kojoj od operacija od D1 do D14 (isključujući privremena skladištenja na mjestima gdje je otpad proizveden radi sakupljanja otpada)

PREPORUČENI NAČIN KORIŠTENJA/RECIKLAŽE GRAĐEVINSKOG OTPADA

Veliki dio građevinskog otpada se može reciklirati. Većina frakcija materijala generiranog za vrijeme demolicije zgrada je preradivo. Reciklaža podrazumijeva drobljenje opeke i betona u sekundarne sirovine.
Reciklaža građevinskog otpada doprinosi uštedi energije i smanjenju prostora potrebnog za odlaganje i smanjuje upotrebu prirodnih resursa. S tim u vezi a za predmetni projekat preporučuju se sledeće mjere – uputstva za upravljanje gradjevinskim otpadom :

Broj otpada	Vrsta otpada	Moguće korištenje/reciklaža
17	GRAĐEVINSKI OTPAD I OTPAD OD RUŠENJA OBJEKATA (UKLJUČUJUĆI ISKOPANU ZEMLJU SA ONEČIŠĆENIH/KONTAMINIRANIH LOKACIJA)	
17 01	beton, opeka/cigle, crjepovi/pločice i keramika	
17 01 01	beton	Konstrukcija puteva, uređenje terena
17 01 02	opeka/cigle	Cijele opeke se mogu koristiti za prvobitnu namjenu, za vanjsko uređenje, Konstrukcija puteva
17 01 03	crjepovi/pločice i keramika	Crijep se može ponovno koristiti Drobljenje za bazu za puteve Zatrpavanje terena Odlaganje na deponiju za inertni materijal
17 01 06*	mješavine ili odvojene frakcije betona, opeke, crijepova/pločica i keramike koje sadrže opasne materije	Firma koja ima dozvolu za zbrinjavanje opasnog otpada
17 01 07	mješavine betona, opeke, crijepova/pločica i keramike koje nisu navedene pod 17 01 06	Drobljenje za bazu za puteve, za zatrpavanje i uređenje terene
17 02	drvo, staklo i plastika	
17 02 01	drvo	Neoštećeni prozori i vrata mogu se ponovno koristiti Drveće i grmlje od uređenja terena se može kompostirati Može se koristiti kao gorivo
17 02 02	staklo	Staklo se može reciklirati za proizvodnju novog stakla ili se može drobljenjem proizvoditi podloga za puteve
17 02 03	plastika	reciklaža
17 02 04*	staklo, plastika i drvo koji sadrže ili su onečišćeni/kontaminirani opasnim materijema	Firma za zbrinjavanje opasnog otpada

17 03	mješavine bitumena, (ugljeni) katran i proizvodi koji sadrže katran	
17 03 01*	mješavine bitumena koje sadrže ugljeni katran	Firma koja ima dozvolu za zbrinjavanje opasnog otpada
17 03 02	mješavine bitumena koje nisu navedene pod 17 03 01	Firma koja ima dozvolu
17 03 03*	(ugljeni) katran i proizvodi koji sadrže katran	Firma koja ima dozvolu
17 04	metali (uključujući njihove legure)	
17 04 01	bakar, bronza, mesing	Predati firmi koja se bavi reciklažom
17 04 02	aluminijum	Predati firmi koja se bavi reciklažom
17 04 04	cink	Predati firmi koja se bavi reciklažom
17 04 05	željezo i čelik	Predati firmi koja se bavi reciklažom
17 04 06	kalaj	Predati firmi koja se bavi reciklažom
17 04 07	miješani metali	Predati firmi koja se bavi reciklažom
17 04 09*	metalni otpad onečišćen/kontaminiran opasnim materijama	Angažovati firmu koja ima dozvolu za postupanje sa opasnim otpadom
17 04 10*	kablovi koji sadrže ulje, (ugljeni) katran i druge opasne materije	Angažovati firmu koja ima dozvolu za postupanje sa opasnim otpadom
17 04 11	kablovi koji nisu navedeni pod 17 04 10	Odlaganje na deponiju
17 05	zemlja (uključujući iskopanu zemlju s onečišćenih/kontaminiranih lokacija), kamenje I iskopana zemlja od rada bagera	
17 05 03*	zemlja i kamenje koji sadrže opasne materije	Angažovati firmu koja ima dozvolu za postupanje sa opasnim otpadom
17 05 04	zemlja i kamenje koji nisu navedeni pod 17 05 03	Zatrpavanje, uređenje terena, pokrivka na deponiji
17 05 05*	iskopana zemlja od rada bagera koja sadrži opasne materije	Uređenje terena, zatrpavanje, poljoprivreda
17 05 06	iskopana zemlja koja nije navedena pod 17 05 05	
17 05 07*	šljunak za pruge koji sadrži opasne materije	Odlaganje na deponiju inertnog materijala
17 05 08	šljunak za pruge koji nije naveden pod 17 05 07	
17 06 01*	izolacioni materijali koji sadrže azbest	Otpad od azbesta odložiti u skladu sa Uputstvom za zbrinjavanje otpada od azbesta
17 06 03*	ostali izolacijski materijali koji se sastoje od ili sadrže opasne materije	Firma koja ima dozvolu za zbrinjavanje opasnog otpada
17 06 04	izolacioni materijali koji nisu navedeni pod 17 06 01 i 17 06 03	Predati firmi koja ima dozvolu za zbrinjavanje

		opasnog otpada
17 06 05*	građevinski materijali koji sadrže azbest	U slučaju sumnje da građevina predviđena za rušenje sadrži azbest, odmah obustaviti radove izvršiti analize i postupiti prema uputstvima za zbrinjavanje
17 08	građevinski materijal na bazi gipsa	
17 08 01*	građevinski materijal na bazi gipsa onečišćen/kontaminiran opasnim materijema	Firma za zbrinjavanje opasnog otpada
17 08 02	građevinski materijal na bazi gipsa koji nije naveden pod 17 08 01	Odlaganje na deponiju inertnog materijala
17 09	ostali građevinski otpad i otpad od rušenja	
17 09 01*	građevinski otpad i otpad od rušenja koji sadrži živu	Firma za zbrinjavanje opasnog otpada
17 09 02*	građevinski otpad i otpad od rušenja koji sadrži PCB	Mora se angažovati firma koja ima dozvolu za zbrinjavanje opasnog otpada
17 09 03*	ostali građevinski otpad i otpad od rušenja (uključujući miješani otpad) koji sadrži opasne materije	Firma za zbrinjavanje opasnog otpada
17 09 04	miješani građevinski otpad i otpad od rušenja koji nije naveden pod 17 0 01, 17 09 02 i 17 09 03	Odlaganja na odobrenom odlagalištu za inertni otpad

M J E R E

za sprečavanje proizvodnje otpada ili smanjenje količine otpada njegovog negativnog uticaja na životnu sredinu

U cilju smanjenja količina generisanog otpada u poslovanju je potrebno primjenjivati savremene tehnologije, moguća ponovna upotreba sredstava (popravka) i drugo.

Privremena skladišta moraju ispunjavati minimalne uslove gradnje, za svrhu skladištenja otpada, kao što su:

- Nepropusne i otporne podne i zidne površine koje se lako čiste i dezinfikuju,
- Opremljenost vodom i strujom,
- Laka dostupnost skladišta za sakupljanje i unutrašnji transport,
- Opremljenost sredstvima za pranje i dezinfekciju ruku,
- Zaključano, kako bi se onemogućio pristup neovlašćenim licima,
- Ograđeni objekat i dvorišni dio,
- Dobro osvjetljena i provjetravana,
- Stvoreni uslovi za odvojeno sakupljanje otpada i drugo,
- Posude za tečni otpad treba da stoje u tankvanama koje prihvataju otpad u slučaju akcidenta.

1. Program obuke zaposlenih

Upravljanje otpadom će biti efikasno ukoliko se primjenjuje kontinuirana obuka radnika i tehničkog osoblja radi ispunjavanja zahtijeva postavljenih u Planu za upravljanje otpadom. Glavni cilj obuke je da se poveća nivo svijesti o zdravlju, bezbjednosti na radu i problemima zaštite životne sredine.

2. Zaštita i zdravlje na radu

Zaštita i zdravlje na radu i bezbjednost radnika uključuju sljedeće: odgovarajuću obuku, zaštitnu odjeću i opremu, rad sa ispravnim sredstvima rada, djelotvoran program zaštite i zdravlja na radu. Zaposleni koji rukuju ovim otpadom imaju sledeću ličnu zaštitnu opremu:

- Radne kombinezone,
- Zaštitne naočare,
- Zaštitna maska,
- Rukavice za jednokratnu upotrebu,
- Posebnu zaštitnu obuću.

Odgovorni inženjer
Vuk Kasalica, dipl. ing. maš.

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1.4 KARAKTERISTIKE I SVOJSTVA MATERIJALA, INSTALACIJA I OPREME

Produktblatt | Wasser – *Product Sheet / Water*

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Ergänzung / *amendment: 07.10* *part 5*

TAV - Sets TMX-F/F
(Station ohne Schieber)
Maße in mm; Gewicht in kg/St.

TAV - Sets TMX-F/F
(set without gate valve)
dimensions in mm; weight in kg/pc

Typ / *type* TAV-TMX	Bezeichnung *designation*	Art.-Nr. *part no.*	Anerkennungen *approvals*	Gewicht *weight*
TAV-Set DN80 TMX-F/F				
Grundausbau *basic equipment*	TAV-Set 80-TMX-F/F-PN16	850009	CE (0786 - CPD - 40030), VdS (G4890031), RUS / GOST-R, MOE	30,7
	TAV-Set 80-TMX-F/F-ÜWA-PN16	850010		31,8
	TAV-Set 80-TMX-F/F-SE2-PN16	850011		38,4
	TAV-Set 80-TMX-F/F-SE2-ÜWA-PN16	850012		39,8
FM	TAV-Set 80-TMX-F/F-FM-PN16	850013	CE (0786 - CPD - 40030), FM	40,5
	TAV-Set 80-TMX-F/F-FM-ÜWA-PN16	850015		41,7
	TAV-Set 80-TMX-F/F-SE2-FM-PN16	850016		48,2
	TAV-Set 80-TMX-F/F-SE2-FM-ÜWA-PN16	850017		49,6
TV	TV-Set 80-TMX-F/F-PN16	850056	CE (0786 - CPD - 40030)	29,1
	TV-Set 80-TMX-F/F-ÜWA-PN16	850057		31,1
TAV-Set DN100 TMX-F/F				
Grundausbau *basic equipment*	TAV-Set 100-TMX-F/F-PN16	850027	CE (0786 - CPD - 40031), VdS (G4910001), RUS / GOST-R, MOE	38,7
	TAV-Set 100-TMX-F/F-ÜWA-PN16	850028		39,8
	TAV-Set 100-TMX-F/F-SE2-PN16	850029		46,4
	TAV-Set 100-TMX-F/F-SE2-ÜWA-PN16	850030		47,8
FM	TAV-Set 100-TMX-F/F-FM-PN16	850031	CE (0786 - CPD - 40031), FM	50,4
	TAV-Set 100-TMX-F/F-FM-ÜWA-PN16	850032		51,5
	TAV-Set 100-TMX-F/F-SE2-FM-PN16	850033		58,1
	TAV-Set 100-TMX-F/F-SE2-FM-ÜWA-PN16	850034		59,5
TV	TV-Set 100-TMX-F/F-PN16	850060	CE (0786 - CPD - 40031)	36,4
	TV-Set 100-TMX-F/F-ÜWA-PN16	850061		38,4
TS	TS-Set 100-TMX/S-F/F-SE2-ÜWA-PN16	850068	VdS (G4930002)	50,4
TAV-Set DN150 TMX-F/F				
Grundausbau *basic equipment*	TAV-Set 150-TMX-F/F-PN16	850045	CE (0786 - CPD - 40032), VdS (G4900056), RUS / GOST-R, MOE	55,7
	TAV-Set 150-TMX-F/F-ÜWA-PN16	850046		56,9
	TAV-Set 150-TMX-F/F-SE2-PN16	850047		63,5
	TAV-Set 150-TMX-F/F-SE2-ÜWA-PN16	850048		64,9
FM	TAV-Set 150-TMX-F/F-FM-PN16	850049	CE (0786 - CPD - 40032), FM	74,7
	TAV-Set 150-TMX-F/F-FM-ÜWA-PN16	850050		75,9
	TAV-Set 150-TMX-F/F-SE2-FM-PN16	850052		82,4
	TAV-Set 150-TMX-F/F-SE2-FM-ÜWA-PN16	850053		83,8
TV	TV-Set 150-TMX-F/F-PN16	850065	CE (0786 - CPD - 40032)	51,7
	TV-Set 150-TMX-F/F-ÜWA-PN16	850066		53,7
TS	TS-Set 150-TMX/S-F/F-SE2-ÜWA-PN16	850070	VdS (G4930003)	65,7

Abkürzungen siehe Seite 2/3 *abbreviations see on page 2/3*

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VIKING

M2-04-00 Teil 5

Ergänzung / *amendment: 07.10* *part 5*

TAV - Sets TMX-F/F
(Station ohne Schieber)

Maße in mm; Gewicht in kg/St.

Abkürzungen:

TAV-Set ..... Trockenalarmventilstation ohne Schieber
TV-Set ..... Tandemventilstation ohne Schieber
TS-Set ..... Trockenschnellstation ohne Schieber
F/F ..... Flanschanschluss oben und unten
FM ..... FM-Ausführung
PN ..... Nenndruck
ÜWA ..... Überwachung
SE2 ..... Schnellöffner

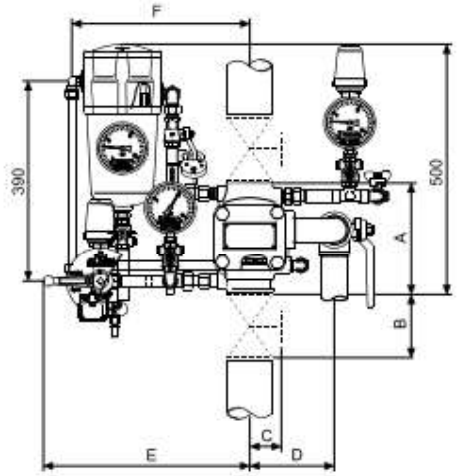
TAV - Sets TMX-F/F
(set without gate valve)

dimensions in mm; weight in kg/pc

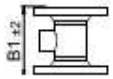
abbreviations:

TAV-Set ..... dry pipe alarm valve set without gate valve
TV-Set ..... tail-end alarm valve set without gate valve
TS-Set .. dry pipe alarm valve set, fast release without gate valve
F/F ..... top and bottom flange connection
FM ..... FM design
PN ..... nominal pressure
Ü ..... monitoring
SE2 ..... accelerator

Bemaßung / *dimensioning*



zusätzlich bei FM-Ausführung
Zwischenflansch F/F
additionally for FM design
spool piece F/F



B1	DN80	180 mm
	DN100	190 mm
	DN150	210 mm

Maß / *dimension*			DN80 [mm]	DN100 [mm]	DN150 [mm]
A	-		240	250	280
B	Schieber *gate valve*	FireKing DIN 3352	180	190	210
		AVK DIN 3352			
		FireKing OS&Y	203	229	267
		AVK OS&Y			
C	Schieber *gate valve*	FireKing DIN 3352	332	362	480
		AVK DIN 3352	382	414	540
		FireKing OS&Y	max. 483	max. 568	max. 765
		AVK OS&Y	350 - 429	420 - 524	581 - 736
D	-		173	203	223
E	-		500	525	570
F	-		342	355	382
Tiefe *depth*	Maße von Rohrmitte *dimensions from pipe centre*		nach hinten ca. 300, nach vorne max. C *at the back approx. 300, at the front max. C*		

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M2_0400_005

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TAV - Sets TMX-F/F
(Station ohne Schieber)

Maße in mm; Gewicht in kg/St.

Instandhaltung: M7-2-04-11
Technische Beschreibung: .....Art.-Nr. 841506 (de/en)
...FM: 841596 (de/en), Leitung AG: 841221 (de/en), TV: 841828 (de/en)
.....TS: 841986 (de/en), Auslöseleitung TS: 841760 (de/en)
Ersatzteile: .....M9-2-04-11, M9-2-04-60 (TS)

Techn. Daten:
zulässiger Betriebsdruck .....max. 16 bar [1]
Wasserversorgungsdruck .....min. 3,0 bar
Äquivalentlänge DN80 .....4,4 m (Rohr 88,9 x 2,9)
DN100 .....8,0 m (Rohr 114,3 x 3,2)
DN150 .....11,6 m (Rohr 168,3 x 4,0)
Medium .....Wasser, Druckluft
Betriebstemperatur .....max. 60 °C
Flanschanschlussmaße .....DIN 2501
Einbaulage .....senkrecht

[1] ab 12,5 bar Betriebsdruck ist ein Manometer 0 bis 25 bar wasserversorgungsseitig zu verwenden

Lieferumfang Grundausbau und FM:
Trockenalarmventil TMX-F/F .....M2-04-12 Teil 2
Zubehör TAV-TMX DN80 - 150 841488
Zubehör TAV-TMX ohne ÜWA 826084
mit ÜWA 858633
Zubehör Montagesatz:
- TAV80, TAV80-FM 841482, 848272
- TAV100, TAV100-FM 841484, 848273
- TAV150, TAV150-FM 841485, 848274

(Im Zubehör "Montagesatz TAV / TAV-FM" sind Schrauben und Dichtungen für 3 Flanschverbindungen enthalten.)

zusätzlich bei TAV - Sets mit Schnellöffner (M2-04-13):
- Schnellöffner SE2, SE2 / FM 816890, 840174
- Zubehör Schnelllöffner SE2, SE2-ÜWA 841504, 848259

zusätzlich bei FM-Ausführung:
Zwischenflansch (M2-04-38) DN80 881929
DN100 881930
DN150 881942

Lieferumfang Varianten TV und TS:
Variante TV .....siehe M2-04-21 Teil 2 (ohne Schieber)
Variante TS .....siehe M2-04-60 Teil 2 (ohne Schieber)

nicht im Lieferumfang enthalten:
Absperrarmaturen .....M2-04-00 Teil 9
Betriebsanleitung WHB 31 (de) 840302
Bedienungsvorschrift M2-04-40
Trichter 1.1/2 komplett M2-04-08
Entwässerungseinheit für Trockenanlagen M2-04-14

zusätzlich bei TV - Sets:
(bei Bedarf für Alarmuntertellung)
- Druckschalter PMA M2-04-10
- Verschraubung z. B. 344-1/2-Zn 773295

TAV - Sets TMX-F/F
(set without gate valve)

dimensions in mm; weight in kg/pc

maintenance: *M7-2-04-11*
technical description: .....*part no. 841506 (de/en)*
...FM: 841596 (de/en), pipe AG: 841221 (de/en), TV: 841828 (de/en)
.....TS: 841986 (de/en), release pipe TS: 841760 (de/en)
spare parts: .....*M9-2-04-11, M9-2-04-60 (TS)*

technical data:
permissible working pressure .....*max. 16 bar* [1]
water supply pressure .....*min. 3,0 bar*
equivalent length DN80 .....*4,4 m (pipe 88,9 x 2,9)*
DN100 .....*8,0 m (pipe 114,3 x 3,2)*
DN150 .....*11,6 m (pipe 168,3 x 4,0)*
medium .....*water, compressed air*
operating temperature .....*max. 60 °C*
flange connection dimensions .....*DIN 2501*
installation position .....*vertical*

[1] *you must use a water supply pressure gauge 0 to 25 bar for operating pressure over 12,5 bar*

included in delivery basic equipment and FM:
dry pipe alarm valve TMX-F/F .....*M2-04-12 part 2*
accessories TAV-TMX DN80 - 150 .....*841488*
accessories TAV-TMX without ÜWA *826084*
with ÜWA *858633*
accessories mounting set:
- *TAV80, TAV80-FM* *841482, 848272*
- *TAV100, TAV100-FM* *841484, 848273*
- *TAV150, TAV150-FM* *841485, 848274*

(in the accessories "mounting set TAV / TAV-FM" screws and gaskets for 3 flange connections are contained)

additionally for TAV - Sets with accelerator (M2-04-13):
- *accelerator SE2, SE2 / FM* *816890, 840174*
- *accessory accelerator SE2, SE2-ÜWA* *841504, 848259*

additionally for FM design:
spool piece (M2-04-38) DN80 .....*881929*
DN100 .....*881930*
DN150 .....*881942*

included in delivery variants TV and TS:
variant TV .....*see M2-04-21 part 2 (without gate valve)*
variant TS .....*see M2-04-60 part 2 (without gate valve)*

not included in delivery:
shut-off valves .....*M2-04-00 part 9*
manual WHB 31 (en) *842085*
operating instructions *M2-04-40*
funnel 1.1/2 complete *M2-04-08*
drain unit for dry pipe systems *M2-04-14*
additionally for TV - Sets:
(optionally for alarm subdivision)
- *pressure switch PMA* *M2-04-10*
- *union e.g. 344-1/2-Zn* *773295*

M2_0400_005
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VIKING®

TECHNICAL DATA

MICROMATIC® STANDARD RESPONSE PENDENT SPRINKLER VK102 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

The Viking Micromatic® Standard Response Pendent VK102 Sprinkler is a small, thermosensitive, glass-bulb spray sprinkler available in several different finishes and temperature ratings to meet design requirements. The special Polyester, and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive environments and are listed/approved as indicated in the Approval Charts.

Viking standard response sprinklers may be ordered and/or used as open sprinklers (glass bulb and pip cap assembly removed) on deluge systems. Refer to Ordering Instructions.

2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

FM Approved: Classes 2001, 2002, 2015, 2017, 2043

VdS Approved: Certificate G414006 & G414004

LPCB Approved

CE: Standard EN 12259-1, DOP_Sprinklers_LPCB_5-2-19 & DOP_VK102WAX_2-12-19

MED Certified: Standard EN 12259-1, EC-certificate 0832-MED-1003

China Approval: Approved according to China GB standard.

NOTE: Other International approval certificates are available upon request.
Refer to Approval Charts and Design Criteria for listing and approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:
Minimum Operating Pressure: 7 psi (0.5 bar)*
Maximum Working Pressure: 175 psi (12 bar) wwp
Factory tested hydrostatically to 500 psi (34.5 bar)
Thread size: 1/2" NPT, 15 mm BSPT
Nominal K-factor: 5.6 U.S. (80.6 metric**)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Overall Length: 2-1/4" (57 mm)

* cULus Listing, FM Approval, and NFPA 13 Installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

**Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Material Standards:
Frame Casting: Brass UNS-C84400 or QM Brass
Deflector: Phosphor Bronze UNS-C51000 (Not for FM Approval) or Copper UNS-C19500
Bulb: Glass, nominal 5 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT coated Sprinklers: Belleville Spring - Exposed, Screw and Pipcap - ENT plated.
Ordering Information: Refer to Table 1

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

Form No. F_031414 20.10.20 Rev 20.1

Replaces Form No. F_031414 Rev 19.2
(Revised CE approval)

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MICROMATIC® STANDARD RESPONSE PENDENT SPRINKLER VK102 (K5.6)

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Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

7. AVAILABILITY

The Viking Micromatic® Standard Response Upright Sprinkler VK100 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: ORDERING INFORMATION
Instructions: Using the sprinkler base part number,
(1) add the suffix for the desired Finish
(2) add the suffix for the desired Temperature Rating.

Sprinkler Base Part No.	Size		1: Finishes		2: Temperature Ratings				
	NPT Inch	BSPT mm	Description	Suffix[1]	Nominal Rating	Bulb Color	Hazard Classification	Max. Ambient Ceiling Temperature[2]	Suffix
12987	1/2	--	Brass	A	135 °F (57 °C)	Orange	Ordinary	100 °F (38 °C)	A
12989	--	15	Chrome	F	155 °F (68 °C)	Red	Ordinary	100 °F (38 °C)	B
20229	--	15	White Polyester [3,5]	M-/W	175 °F (79 °C)	Yellow	Intermediate	150 °F (65 °C)	D
			Black Polyester [3,5]	M-/B	200 °F (93 °C)	Green	Intermediate	150 °F (65 °C)	E
			Wax	C	212 °F (100 °C)	Green	Intermediate	150 °F (65 °C)	M
			Wax over Polyester	V-/W	286 °F (141 °C)	Blue	High	225 °F (107 °C)	G
			ENT [3,4,5]	JN	360 °F (182 °C)	Mauve	Extra High	300 °F (149 °C)	H
					500 °F (260 °C)	Black	Ultra High[6]	465 °F (240 °C)	L

Example: 12987MB/W = VK102 with White Polyester Finish and 155 °F (68 °C) Nominal temperature rating. This sprinkler is to be installed into an area with a maximum ambient temperature of 100 °F (38 °C) meaning if the area will experience temperatures above the maximum ambient rating, you shall use a higher temperature-rated sprinkler.

Corrosion Resistant Coatings[5]

- White Polyester and Black Polyester in all temperature ratings.
- ENT in all temperature ratings except 135 °F (57 °C).
- Wax-Coated Brass and Wax over Polyester[7] for sprinklers with the following temperature ratings:
  155 °F (68 °C) Lt. Brown Wax | 175 °F (79 °C) Brown Wax | 200 °F (93 °C) Brown Wax | 286 °F (141 °C) Dk. Brown Wax[7]

Accessories

Sprinkler Wrenches (see Figure 1):

A. Standard Wrench: Part No. 21475M/B
B. Standard Wrench for Wax Coated Sprinklers: Part No. 10896W/B
C. Socket Wrench for Recessed Pendent Sprinklers: Part No. 13655W/B (A 1/2" ratchet is required, not available from Viking)
D. Socket Wrench for Wax Coated Sprinklers: Part No. 13577W/B (A 1/2" ratchet is required, not available from Viking)
E. Optional Protective Sprinkler Cap Remover/Escutcheon Installer Tool[8]: Part No. 15915

Sprinkler Cabinet:

A. Up to 6 sprinklers: Part number 01724A (available since 1971).
B. 6-12 Sprinklers: Part number 01725A (available since 1971).

Footnotes

1. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.
2. Based on NFPA 13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
3. UL Listed as corrosion resistant.
4. FM Approved corrosion resistant.
5. The corrosion resistant and corrosion proofing coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart(s). These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester and ENT coatings. For ENT coated automatic sprinklers, the waterway is coated.
6. Sprinklers of Ultra-High temperature rating are intended for use inside ovens, dryers, or similar enclosures with normal operating temperatures above 300 °F (149 °C). Where the ambient temperature around the Ultra-High temperature rated sprinkler is significantly reduced below 300 °F (149 °C), response time may be severely retarded
7. Wax melting point is 170 °F (76 °C) for 286 °F (141 °C) temperature rated sprinklers. For more inforamation regarding wax coatings, refer to Bulletin Form No. F_010201.
8. Allows use from the floor by attaching a length of 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to Bulletin F_051808.

VIKING®	TECHNICAL DATA	MICROMATIC® STANDARD RESPONSE PENDENT SPRINKLER VK102 (K5.6)

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Figure 1: Sprinkler Wrenches

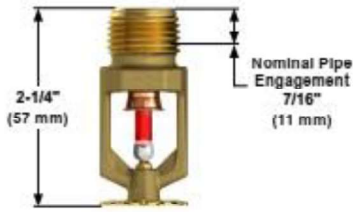

Figure 2: Sprinkler Dimensions

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Approval Chart 1 (UL)

Micromatic® Standard Response Pendent Sprinkler VK102
Maximum 175 PSI (12 bar) WWP

KEY: Temperature / Finish / A1X ← Escutcheon (if applicable)

Sprinkler Base Part Number[1]	SIN	Thread Size		Nominal K-factor		Overall Length		Listings and Approvals[3] (Refer also to UL Design Criteria.)					
		NPT	BSPT	U.S.	metric[2]	Inches	mm	cULus[4]	VdS	LPCB	CE[8]	MED[9]	China Approval
12987	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B3, B1Y, C4, D2, E5, G5Z	A1	A1, B3, B1Y	F1, G1Y, B4[12]	F2X	--
12989	VK102	--	15 mm	5.6	80.6	2-1/4"	57	A1, B3, B1Y, C4, D2, E5, G5Z	A1	A1, B3, B1Y	F1, G1Y, B4[12]	F2X	--
20229[10]	VK102	--	15 mm	5.6	80.6	2-1/4"	57	E6	--	--	--	--	E6
NOTICE - Product Below - No longer offered.													
10139	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B3, B1Y, C4, D2, E5, G5Z	--	--	--	--	--
10173	VK102	--	15 mm	5.6	80.6	2-1/4"	57	A1, B3, B1Y, C4, D2, E5, G5Z	A1	A1, B3, B1Y	--	F2X	--
18020	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B3, B1Y, C4, D2, E5, G5Z	A1	A1, B3, B1Y	F1, G1X	F2X	--

Approved Temperature Rating Codes

A = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), and 360 °F (182 °C)
B = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
C = 286 °F (141 °C)
D = 500 °F (260 °C)[7]
E = 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), 360 °F (182 °C), and 500 °F (260 °C)[7]
F = 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), and 360 °F (182 °C)
G = 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)

Approved Finish Codes

1 = Brass, Chrome, White Polyester[5,6] and Black Polyester[5,6]
2 = Brass and Chrome
3 = Wax-Coated Brass and Wax Over Polyester[5]
4 = High Temperature 200 °F (93 °C) Wax Coating (corrosion resistant); maximum ambient temperature allowed at ceiling = 150 °F (65 °C)
5 = ENT[5]
6 = Chrome

Approved Escutcheon Codes

X = Recessed with the Viking Model E-1, E-2, or E-3 Recessed Escutcheon
Y = Standard surface-mounted escutcheon or recessed with the Viking Model E-1, E-2, or E-3 Recessed Escutcheon
Z = Standard surface-mounted escutcheon or recessed with the Viking Model E-1 Recessed Escutcheon

Footnotes

1. Base part number is shown. For complete part number, refer to Viking's current price schedule.
2. Metric K-factor shown is for use when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
3. This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.
4. Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
5. cULus Listed as corrosion resistant.
6. Other colors are available on request with the same Listings and Approvals as the standard colors.
7. Sprinklers of Ultra-High temperature rating are intended for use inside ovens, dryers, or similar enclosures with normal operating temperatures above 300 °F (149 °C). Where the ambient temperature around the Ultra-High temperature rated sprinkler is significantly reduced below 300 °F (149 °C), the response time of the Ultra-High temperature rated sprinkler may be severely retarded.
8. CE: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-0021.
9. MED Certified, Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003 and 0832-MED-1008.
10. Approved according to China GB standard.
11. CE: Standard EC 12259-1, Declaration of Performance DOP_Sprinklers_LPCB_5-2-19 & DOP_VK102WAX_2-12-19

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1.)

cULus Listing Requirements:

The Viking Micromatic® Standard Response Pendent Sprinkler VK102 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light, Ordinary, and Extra Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray pendent sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

Form No. F_031414 20.10.20 Rev 20.1

VIKING®

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Approval Chart 2 (FM)

Micromatic® Standard Response Pendent Sprinkler VK102
Maximum 175 PSI (12 bar) WWP

KEY: Temperature, Finish, Escutcheon (if applicable) — A1X

Sprinkler Base Part Number[1]	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals[3] (Refer also to Design Criteria below.)
		NPT	BSPT	U.S.	metric[2]	Inches	mm	
12987	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B2, C3, D1, E4, G1Y, G4Z
12989	VK102	--	15 mm	5.6	80.6	2-1/4"	57	A1, B2, C3, D1, E4, G1Y, G4Z
20229[7]	VK102	--	15 mm	5.6	80.6	2-1/4"	57	E5
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)								
10139	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B2, C3, D1, E4, G1Y, G4Z
10173	VK102	--	15 mm	5.6	80.6	2-1/4"	57	A1, B2, C3, D1, E4, G1Y, G4Z
18020	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B2, C3, D1, G1Y

Approved Temperature Rating Codes

A = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 212 °F (100 °C), 286 °F (141 °C), and 360 °F (182 °C)
B = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 212 °F (100 °C)
C = 286 °F (141 °C)
D = 500 °F (260 °C)[5]
E = 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), 360 °F (182 °C), and 500 °F (260 °C)[5]
F = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
G = 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)

Approved Finish Codes

1 = Brass, Chrome, White Polyester[4,6] and Black Polyester[4,6]
2 = Wax-Coated Brass (corrosion resistant)
3 = High Temperature 200 °F (93 °C) Wax Coating (corrosion resistant); maximum ambient temperature allowed at the ceiling = 150 °F (65 °C)
4 = ENT[6]
5 = Chrome

Approved Escutcheon Codes

Y = Standard surface-mounted escutcheon or recessed with the Viking Model E-1, E-2, or E-3 Recessed Escutcheon
Z = Standard surface-mounted escutcheon or recessed with the Viking Model E-1 Recessed Escutcheon

Footnotes

1. Base part number is shown. For complete part number, refer to Viking's current price schedule.
2. Metric K-factor shown is for use when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
3. This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.
4. Other colors are available on request with the same Approvals as the standard colors.
5. Sprinklers of Ultra-High temperature rating are intended for use inside ovens, dryers, or similar enclosures with normal operating temperatures above 300 °F (149 °C). Where the ambient temperature around the Ultra-High temperature rated sprinkler is significantly reduced below 300 °F (149 °C), the response time of the Ultra-High temperature rated sprinkler may be severely retarded.
6. FM approved as corrosion resistant.
7. Approved according to China GB standard.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2.)

FM Approval Requirements:

The Viking Micromatic® Standard Response Pendent Sprinkler VK102 is is FM Approved as standard response **Non-Storage** pendent sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

Form No. F_031414 20.10.20 Rev 20.1

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Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
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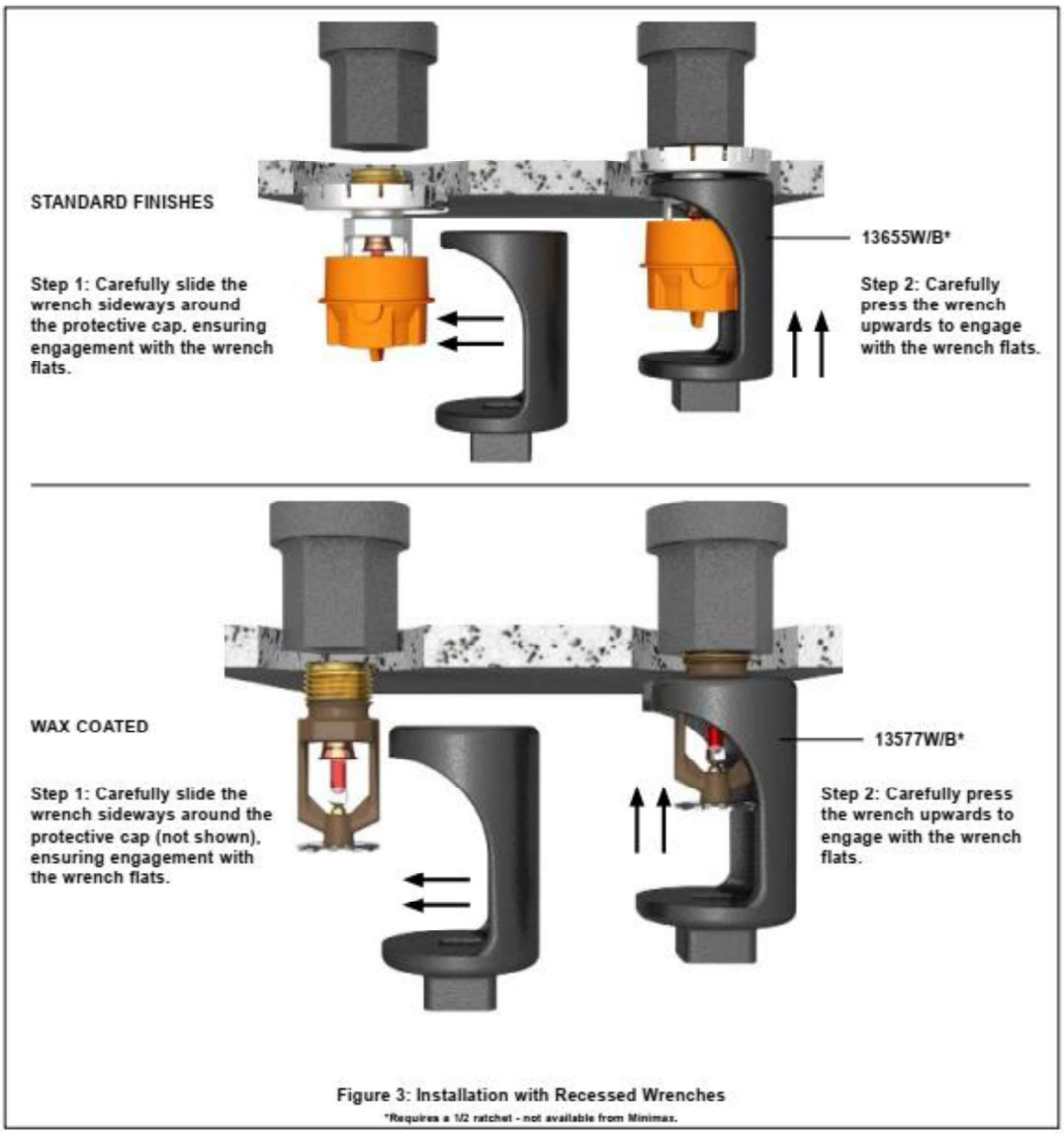

Figure 3: Installation with Recessed Wrenches

*Requires a 1/2 ratchet - not available from Minimax.

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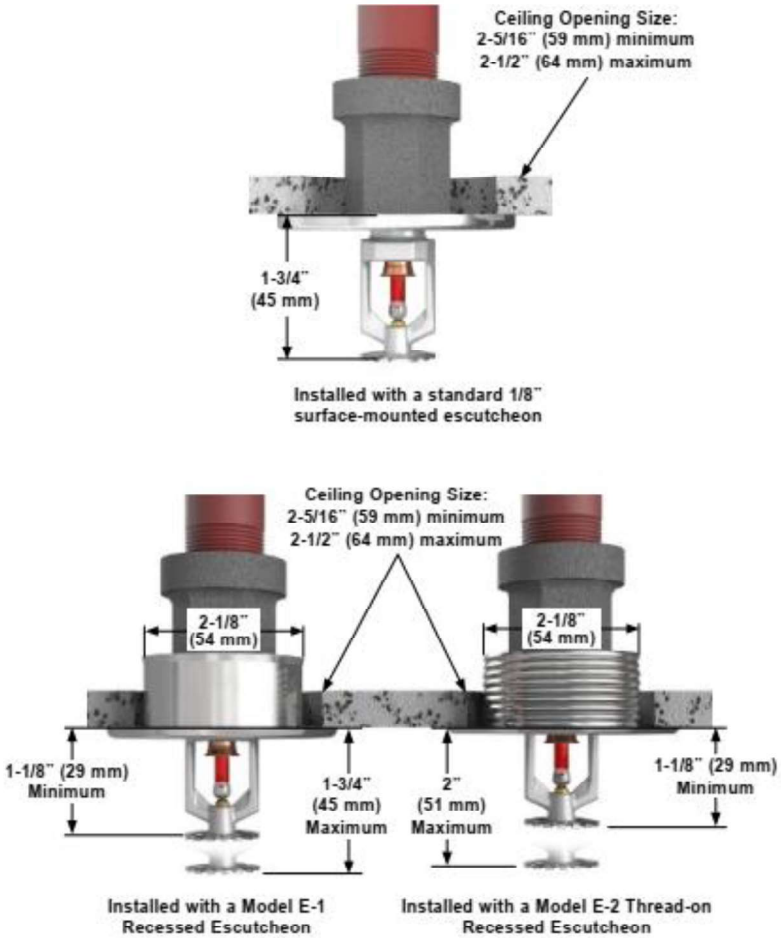

Figure 4: Installation Dimensions with Escutcheons

Product Sheet | Water Products

FIREKING

Control Valves & Devices | Pressure Control | Pressure Reducing Valve | FK-PRV3

SPECIFICATIONS	
Sizes available (nominal)	1-1/2"/DN40 2"/DN50 2-1/2"/DN65 3"/DN80 4"/DN100 6"/DN150 8"/DN200 10"/DN250 12"/DN300
Approvals	UL, FM APPROVED
Connections	*Flange x Flange* - ANSI #150 - PN16 EN1092-2 *Groove x Groove* (AWWA C606) *Threaded*: DN40 available on request with BSP or NPT thread connection
Max. working pressure	17.2 bar / 250 psi
Outlet set pressure range	1-1/2"/DN40 to 6"/DN150: - 5.5-13.8 bar / 80-200 psi 8"/DN200 to 12"/DN300: - 2.4-13.8 bar / 35-200 psi
Factory set outlet pressure	Approximately 7 bar / 102 psi
Valve materials	*Standard*: - Ductile iron ASTM A536 *Optional*: - Cast steel ASTM A216 WCB - Stainless steel ASTM A743 CF8M & CF8
Trim materials	*Standard*: - Copper tubing type L - Brass CUZN40PB2 *Optional*: - Stainless steel ASTM A743 CF8M
Finishes	*Standard*: - Fusion bonded epoxy (FBE) & Polyester *Optional*: - Rilsan PA11/Nylon - Internal enamel glazing

Product Description

The model FK-PRV3 pressure-reducing valve is designed for use in water-filled pipes where in-line pressure reduction is required. The FK-PRV3 will maintain the desired outlet set pressure regardless of the incoming inlet pressure. The FK-PRV3 is also suitable for smoothing out fluctuating inlet pressures.

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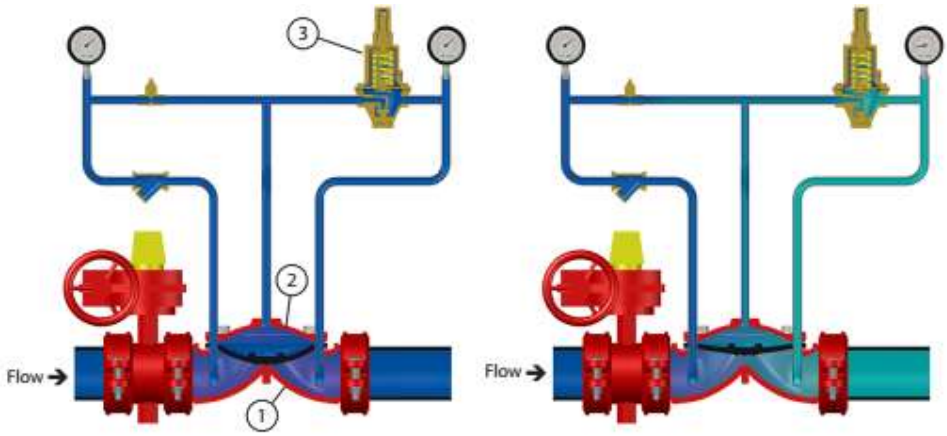
Product Sheet | Water Products

FIREKING

Control Valves & Devices | Pressure Control | Pressure Reducing Valve | FK-PRV3

Operation



Outlet pressure above set-point: this will cause the pilot valve to close, increasing the pressure in the priming chamber and causing the main valve to close

Outlet pressure below set-point: this will cause the pilot valve to open, decreasing the priming pressure and causing the main valve to open until the set-point is reached

Overview:

During flow conditions, the pilot valve senses the downstream pressure and via the integrated trim opens or closes the main pressure-reducing valve accordingly to increase or decrease the outlet pressure to the desired set-point.

Detailed:

The opening and closing of the main valve is determined by the pressure in the priming chamber of the valve. As the priming pressure increases, the valve will close and reduce (1) the outlet pressure of the valve. As the priming pressure decreases (2), the valve will open and increase the outlet pressure.

The priming chamber is connected to the inlet of the FK-PRV3 and is released/controlled by the pilot valve. If the outlet pressure of the FK-PRV3 is below the set-point of the pilot valve then the pilot valve will open, releasing pressure from the priming chamber (3). This allows the FK-PRV* to open and the outlet pressure to increase.

As the outlet pressure increases and reaches the set-point of the pilot valve, it closes. As the pilot valve closes the pressure in the priming chamber increases and starts to close the FK-PRV3 reducing the outlet pressure.

The pilot valve will continuously balance the outlet pressure in this way achieving the desired set point.

Note: If there is no flow demand on the FK-PRV3 then the outlet pressure of the FK-PRV3 rises causing the valve to close.

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Product Sheet | Water Products

FIREKING

Control Valves & Devices | Pressure Control | Pressure Reducing Valve | FK-PRV3

Installation instructions

1. The FK-PRV3 is supplied factory assembled and tested. The pilot valve set pressure is field adjustable. The needle valve is factory pre-set and is not field adjustable. Changes to the trim arrangement may influence the performance of the valve and the product approval.
2. The FK-PRV3 is for installation in WET systems only and must be installed in a location above 4 °C.
3. The FK-PRV3 can be mounted horizontally or vertically but the correct orientation must be specified at the time of ordering. It is possible to convert the orientation on-site – contact us for further details.
4. Verify that the flow direction matches the flow arrow on the valve body and
5. Ensure adequate pipework support either side of the valve so that the pipework weight is not loaded onto the valve.

Commissioning

Fill the System:

1. Verify that downstream drain valves are closed and that there are no leaks.
2. Open a valve at the end of the system such as the remote test valve or drain valve. Take care to ensure trapped air is removed from the system.
3. Partially open the main water supply control valve feeding the FK-PRV3.
4. After the system fills with water, close the test/drain valve and
5. Completely open the main water supply control valve feeding the FK-PRV3.

Adjusting the set pressure:

1. Unscrew the pilot valve protection cap.
2. Release the pilot valve's locking nut.
3. Open a test valve or drain valve downstream of the FK-PRV3 to allow necessary flow demand through the valve.
4. Turn the adjustment screw clockwise to increase the downstream pressure and anticlockwise to decrease the downstream pressure.
5. Once the desired set-pressure is achieved tighten the locknut and close the test/drain valve and
6. Reinstall the protection cap.

Note: a surging/fluctuating flow through the valve frequently indicates air in the system. Bleed air form all high points in the system and begin the adjustment process again.

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Product Sheet | Water Products

FIREKING

Control Valves & Devices | Pressure Control | Pressure Reducing Valve | FK-PRV3

Servicing & Maintenance

Pressure reducing valves should be serviced and maintained if problems are observed, where required by local regulation and according to the recommended procedures given below:

Weekly

1. Check supply and outlet pressures are within expectation.

Monthly

1. Conduct weekly checks and
2. Verify that the FK-PRV3 valve is free from physical damage.

Quarterly

1. Conduct monthly checks and
2. Observe the trim connections and piping for leakage or damage.

Annually

1. Conduct quarterly checks;
2. Close off the supply and drain the system or otherwise isolate the FK-PRV3 and
3. Follow the Commissioning procedure and check the correct performance of the valve .

Every 5 years

1. Close off the supply and drain the system or otherwise isolate the FK-PRV3.
2. Loosen and remove all trim and associated fittings form the valve.
3. Remove all the cover bolts from the FK-PRV3.
4. Check the diaphragm for wear & tear, damage and check for build-up of dirt/debris inside the valve. Clean the valve interior and replace the diaphragm if it shows signs of excessive wear & tear or damage.
5. If the diaphragm is replaced the identification tag on the diaphragm should be oriented in the same direction as the flow direction arrow on the valve body.
6. Reinstall the valve cover: use the anti-seize paste tube supplied in the maintenance kit for bolts and nuts lubrication. Cover bolt torque should be as follows:

Valve size	Cover bolt torque N.m
2"/DN50	30
2-1/2"/DN65, 3"/DN80 & 4"/DN100	49
6"/DN150	79
8"/DN200	88
10"/DN250 & 12"/DN300	98

7. The pilot valve should be removed and checked internally for any signs of damage or excessive wear & tear. A spares kit is available for the pilot valve.

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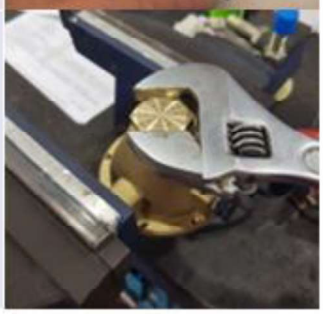
Control Valves & Devices | Pressure Control | Pressure Reducing Valve | FK-PRV3

Pilot valve:

a) Remove the cover of the pilot valve
b) Lift off the spring cap and spring

c) Unscrew and remove the central retaining nut and remove the diaphragm assembly and check for damage – replace if necessary
d) Clean the pilot valve interior

e) If there are any signs of leakage form the base of the pilot valve remove the bottom nut and replace the o-ring
f) Reassemble the pilot valve and place back onto the trim



8. Reinstall the trim taking care not to bend tubing or overtighten the compression fitting's nuts.
9. Re-commission the valve according to the commissioning instructions in this document.

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Product Sheet | Water Products

FIREKING

Control Valves & Devices | Pressure Control | Pressure Reducing Valve | FK-PRV3

Ordering

To identify the correct valve configuration the following information is required:

Criteria	Options
1. Size	1-1/2"/DN40
	2"/DN50
	2-1/2"/DN65
	3"/DN80
	4"/DN100
	6"/DN150
	8"/DN200
	10"/DN250
	12"/DN300
2. Orientation	Standard: Horizontal
	Optional: Vertical
3. Connection	Groove x Groove (*see note 1*)
	Flange x Flange PN16
	Flange x Flange ANSI
	Threaded (DN40 only) BSP or NPT
4. Material	Standard: Ductile Iron valve with copper trim
	Optional: *See note 2*
5. Finish	Standard: Fusion bonded epoxy (FBE) & Polyester
	Optional: *See note 2*

Notes:

1. Grooved dimensions: DN65 available in both 73.0 mm and 76.1 mm
DN150 available in both 165.0 mm and 168.3 mm

2. Materials & Finishes: If you require materials or finishes other than the standard ones please contact your local Viking office and we will discuss this with you

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FIREKING

Control Valves & Devices | Pressure Control | Pressure Reducing Valve | FK-PRV3

Part numbering & weights for standard options:

Size	Connection[1]	Material[2]	Finish[3]	Part number		Weight (kg)
				Horizontal	Vertical	
1-1/2"/DN40 (48.3)	GG	DI	FBE / Polyester	FK-PRV3-H048GD	FK-PRV3-V048GD	7.8
2"/DN50 (60.3)	GG	DI	FBE / Polyester	FK-PRV3-H060GD	FK-PRV3-V060GD	8.7
2-1/2"/DN65 (73.0)	GG	DI	FBE / Polyester	FK-PRV3-H073GD	FK-PRV3-V073GD	15
2-1/2"/DN65 (76.1)	GG	DI	FBE / Polyester	FK-PRV3-H076GD	FK-PRV3-V076GD	15
3"/DN80 (88.9)	GG	DI	FBE / Polyester	FK-PRV3-H089GD	FK-PRV3-V089GD	16
4"/DN100 (114.3)	GG	DI	FBE / Polyester	FK-PRV3-H114GD	FK-PRV3-V114GD	21
6"/DN150 (165.1)	GG	DI	FBE / Polyester	FK-PRV3-H165GD	FK-PRV3-V165GD	36
6"/DN150 (168.3)	GG	DI	FBE / Polyester	FK-PRV3-H168GD	FK-PRV3-V168GD	36
8"/DN200 (219.1)	GG	DI	FBE / Polyester	FK-PRV3-H219GD	FK-PRV3-V219GD	52
1-1/2"/DN40	FF ANSI	DI	FBE / Polyester	FK-PRV3-H0150FAD	FK-PRV3-V0150FAD	*Note*[4]
2"/DN50	FF ANSI	DI	FBE / Polyester	FK-PRV3-H0200FAD	FK-PRV3-V0200FAD	12
2-1/2"/DN65	FF ANSI	DI	FBE / Polyester	FK-PRV3-H0250FAD	FK-PRV3-V0250FAD	15.5
3"/DN80	FF ANSI	DI	FBE / Polyester	FK-PRV3-H0300FAD	FK-PRV3-V0300FAD	21.5
4"/DN100	FF ANSI	DI	FBE / Polyester	FK-PRV3-H0400FAD	FK-PRV3-V0400FAD	28
6"/DN150	FF ANSI	DI	FBE / Polyester	FK-PRV3-H0600FAD	FK-PRV3-V0600FAD	52
8"/DN200	FF ANSI	DI	FBE / Polyester	FK-PRV3-H0800FAD	FK-PRV3-V0800FAD	70
10"/DN250	FF ANSI	DI	FBE / Polyester	FK-PRV3-H1000FAD	FK-PRV3-V1000FAD	111
12"/DN300	FF ANSI	DI	FBE / Polyester	FK-PRV3-H1200FAD	FK-PRV3-V1200FAD	142
1-1/2"/DN40	FF PN16	DI	FBE / Polyester	FK-PRV3-H0150FPD	FK-PRV3-V0150FPD	*Note*[4]
2"/DN50	FF PN16	DI	FBE / Polyester	FK-PRV3-H0200FPD	FK-PRV3-V0200FPD	12
2-1/2"/DN65	FF PN16	DI	FBE / Polyester	FK-PRV3-H0250FPD	FK-PRV3-V0250FPD	15.5
3"/DN80	FF PN16	DI	FBE / Polyester	FK-PRV3-H0300FPD	FK-PRV3-V0300FPD	21.5
4"/DN100	FF PN16	DI	FBE / Polyester	FK-PRV3-H0400FPD	FK-PRV3-V0400FPD	28
6"/DN150	FF PN16	DI	FBE / Polyester	FK-PRV3-H0600FPD	FK-PRV3-V0600FPD	52
8"/DN200	FF PN16	DI	FBE / Polyester	FK-PRV3-H0800FPD	FK-PRV3-V0800FPD	70
10"/DN250	FF PN16	DI	FBE / Polyester	FK-PRV3-H1000FPD	FK-PRV3-V1000FPD	111
12"/DN300	FF PN16	DI	FBE / Polyester	FK-PRV3-H1200FPD	FK-PRV3-V1200FPD	142

Notes:
[1] *GG = Groove-Groove; FF = Flange-Flange*
[2] *DI = Ductile Iron*
[3] *FBE = Fusion Bonded Epoxy*
[4] *Weight available on request*

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Product Sheet | Water Products

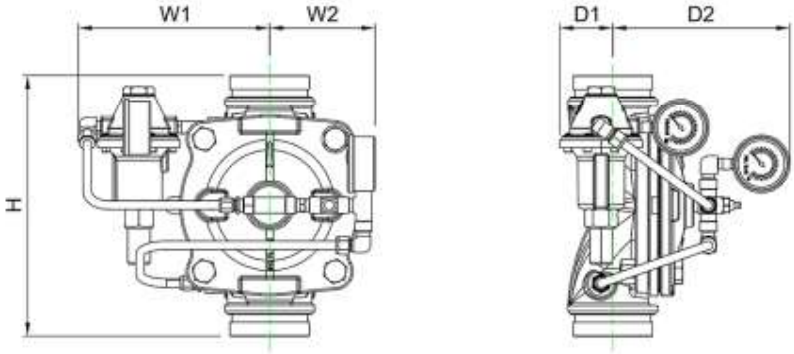
FIREKING

Control Valves & Devices | Pressure Control | Pressure Reducing Valve | FK-PRV3

Parts

Description	Material
Valve body	Ductile iron, ASTM A536
Valve diaphragm	Nitrile
Pilot valve (17.2 bar / 250 psi) and bracket	Brass, nickel plated (valve) AISI 316 (bracket)
Trim tubing	Copper, Type L
Trim fittings	Brass
Pressure gauge, 90 mm diameter, 1/4" NPT	Stainless steel casing, brass fitting Inlet: 0-25 bar / 0-363 psi Outlet: 0-16 bar / 0-232 psi
Needle valve	Brass, nickel plated

Dimensions



Size		DN40	DN50	DN65	DN80	DN100	DN150	DN200	DN250	DN300
Dimensions (mm)	H	197	198	225	290	346	412	470	635	749
	D1	54	56	54	59	65	88	125	197	234
	D2	158	168	185	197	216	278	348	389	394
	W1	117	115	115	119	133	169	177	233	240
	W2	154	177	204	212	233	281	277	248	248

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VIKING®

TECHNICAL DATA

MICROMATIC® STANDARD RESPONSE UPRIGHT SPRINKLER VK200 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

1. DESCRIPTION

The Viking Micromatic® Standard Response Upright VK200 Sprinkler is a small, thermosensitive, glass-bulb spray sprinkler available in several different finishes, temperature ratings, and K-Factors to meet design requirements. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive environments and are listed/approved as as indicated in the Approval Charts.

Viking standard response sprinklers may be ordered and/or used as open sprinklers (glass bulb and pip cap assembly removed) on deluge systems. Refer to Ordering Instructions.

WARNING: Cancer and Reproductive Harm- www.P65Warnings.ca.gov

2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

FM Approved: Class Series 2000

VdS Approved: Certificates G414013, G414014, G498006, and G4060055

LPCB Approved: Certificate 096e/06

CE Certified: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001, EC-certificate of constancy of performance 0832-CPR-S0021

China Approval: Approved according to China GB Standard

MED Certified: Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003

NOTE: Other International approval certificates are available upon request.
Refer to Approval Charts and Design Criteria for listing and approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)†
Maximum Working Pressure: 175 psi (12 bar) wwp
Factory tested hydrostatic rating: 500 psi (34.5 bar)
Thread size: 1/2" NPT, 15 mm BSP, 3/4" NPT, 20 mm BSPT
Nominal K-Factor: 8.0 U.S. (115.2 metric**)
Glass-bulb fluid temperature rating: -65 °F (-55 °C)
Overall Length: 2-3/8" (60 mm)

† cULus Listing, FM Approval, and NFPA 13 Installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

** Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Material Standards:

Frame Casting: Brass UNS-C84400
Deflector: Copper UNS-C19500
Bulb: Glass, nominal 5 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT coated Sprinklers: Belleville Spring - Exposed, Screw and Pipcap - ENT plated.

††Not for FM Approval.

Ordering Information: Refer to Table 1.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

Form No. F_032814 19.10.14 Rev 19.2

Replaces Form No. F_032814 Rev 19.1
(Revised China Approval; removed 20381)

VIKING®

TECHNICAL DATA

MICROMATIC® STANDARD RESPONSE UPRIGHT SPRINKLER VK200 (K8.0)

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6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Micromatic® Standard Response Upright Sprinkler VK200 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: ORDERING INFORMATION
Instructions: Using the sprinkler base part number,
(1) add the suffix for the desired Finish
(2) add the suffix for the desired Temperature Rating.

Sprinkler Base Part No.	Size		1: Finishes		2: Temperature Ratings				
	NPT Inch	BSPT mm	Description	Suffix[1]	Nominal Rating	Bulb Color	Hazard Classification	Max. Ambient Ceiling Temperature[2]	Suffix
18263	3/4	--	Brass	A	135 °F (57 °C)	Orange	Ordinary	100 °F (38 °C)	A
18266	--	20	Chrome	F	155 °F (68 °C)	Red	Ordinary	100 °F (38 °C)	B
18268[8]	1/2	--	White Polyester	M-/W	175 °F (79 °C)	Yellow	Intermediate	150 °F (65 °C)	D
20377[9]	--	20	Black Polyester	M-/B	200 °F (93 °C)	Green	Intermediate	150 °F (65 °C)	E
			Wax	C	286 °F (141 °C)	Blue	High	225 °F (107 °C)	G
			Wax over Polyester	V-/W	360 °F (182 °C)	Mauve	Extra High	300 °F (149 °C)	H
			ENT [3]	JN	500 °F (260 °C)	Black	Ultra High[6]	465 °F (240 °C)	L

Example: 13001MB/W = VK200 with White Polyester Finish and 155 °F (68 °C) Nominal temperature rating. This sprinkler is to be installed into an area with a maximum ambient temperature of 100 °F (38 °C) meaning if the area will experience temperatures above the maximum ambient rating, you shall use a higher temperature-rated sprinkler.

Corrosion Resistant Coatings[5]

- White Polyester and Black Polyester in all temperature ratings.
- ENT in all temperature ratings except 135 °F (57 °C).
- Wax-Coated Brass and Wax over Polyester[7] for sprinklers with the following temperature ratings:
  155 °F (68 °C) Lt. Brown Wax | 175 °F (79 °C) Brown Wax | 200 °F (93 °C) Brown Wax | 286 °F (141 °C) Dk. Brown Wax[7]

Accessories

Sprinkler Wrenches (see Figure 1):
A. Standard Wrench: Part No. 21475M/B
B. Standard Wrench for Wax Coated Sprinklers: Part No. 10896W/B
C. Socket Wrench for Recessed Pendent Sprinklers: Part No. 13655W/B (A 1/2" ratchet is required, not available from Viking)
D. Socket Wrench for Wax Coated Sprinklers: Part No. 13577W/B (A 1/2" ratchet is required, not available from Viking)
E. Optional Protective Sprinkler Cap Remover/Escutcheon Installer Tool[8]: Part No. 15915

Sprinkler Cabinet:
A. Up to 6 sprinklers: Part number 01724A (available since 1971).
B. 6-12 Sprinklers: Part number 01725A (available since 1971).

Footnotes

1. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.
2. Based on NFPA 13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
3. FM Approved corrosion resistant.
4. The corrosion resistant and corrosion proofing coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart(s). These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester and ENT coatings. For ENT coated automatic sprinklers, the waterway is coated.
5. Sprinklers of Ultra-High temperature rating are intended for use inside ovens, dryers, or similar enclosures with normal operating temperatures above 300 °F (149 °C). Where the ambient temperature around the Ultra-High temperature rated sprinkler is significantly reduced below 300 °F (149 °C), response time may be severely retarded
6. Wax melting point is 170 °F (76 °C) for 286 °F (141 °C) temperature rated sprinklers. For more inforamation regarding wax coatings, refer to Bulletin Form No. F_010201.
7. Allows use from the floor by attaching a length of 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to Bulletin F_051808.
8. The 1/2" NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.
9. Approved according to China GB Standard.

Form No. F_032814 19.10.14 Rev 19.2

VIKING®

TECHNICAL DATA

MICROMATIC® STANDARD RESPONSE UPRIGHT SPRINKLER VK200 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

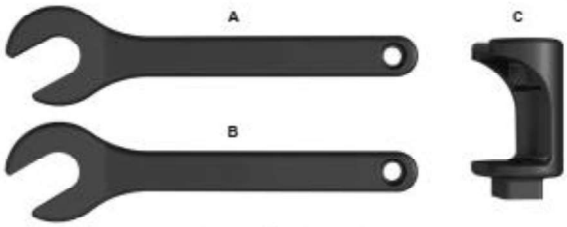

Figure 1: Sprinkler Wrenches

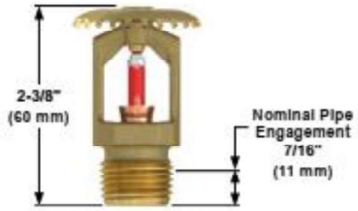

Figure 2: Sprinkler Dimensions

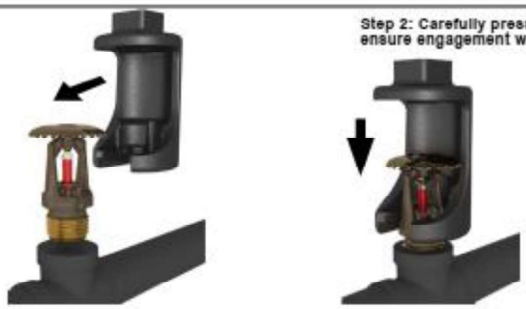

Figure 3: Wax Coated Sprinkler Installation

VIKING®

TECHNICAL DATA

MICROMATIC® STANDARD RESPONSE UPRIGHT SPRINKLER VK200 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
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Approval Chart 1 (UL)

Micromatic® Standard Response Upright Sprinklers
Maximum 175 PSI (12 bar) WWP

Sprinkler Base Part Number[1]	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals[3] (Refer also to UL Design Criteria.)					
		NPT	BSPT	U.S.	metric[2]	Inches	mm	cULus[4]	VdS	LPCB	CE[8]	[10]	China Approval
Standard Orifice													
18263	VK200	3/4"	20 mm	8.0	115.2	2-1/4"	57	A1, B4, C5, D3, E6	A2	A2, B4	F3	F3	--
18266	VK200	--	20 mm	8.0	115.2	2-1/4"	57	A1, B4, C5, D3, E6	A2	A2, B4	F3	F3	--
18268[9]	VK200	1/2"	15 mm	8.0	115.2	2-1/4"	57	A1, B4, C5, D3, E6	A2	A2, B4	F3	F3	--
20377[11]	VK200	--	20 mm	8.0	115.2	2-1/4"	57	G3	--	--	--	--	G3
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)													
10220[9]	VK200	1/2"	15 mm	8.0	115.2	2-1/4"	57	A1, B4, C5, D3, E6	A2	A2, B4	F3	F3	--
10141	VK200	3/4"	20 mm	8.0	115.2	2-1/4"	57	A1, B4, C5, D3, E6	A2	A2, B4	F3	F3	--
10169	VK200	--	20 mm	8.0	115.2	2-1/4"	57	A1, B4, C5, D3, E6	A2	A2, B4	F3	F3	--

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), and 360 °F (182 °C)

B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)

C - 286 °F (141 °C)

D - 500 °F (260 °C)[7]

E - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), 360 °F (182 °C), and 500 °F (260 °C)[7]

F - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), and 360 °F (182 °C)

G - 155 °F (68 °C), 200 °F (93 °C), and 286 °F (141 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester[5,6] and Black Polyester[5,6]

2 - Brass, Chrome, White Polyester[6], and Black Polyester[6]

3 - Brass and Chrome

4 - Wax-Coated Brass and Wax Over Polyester[5]

5 - High Temperature 200 °F (93 °C) Wax Coating (corrosion resistant); maximum ambient temperature allowed at ceiling = 150 °F (65 °C)

6 - ENT[5]

Footnotes

1. Base part number is shown. For complete part number, refer to Viking's current price schedule.
2. Metric K-factor shown is for use when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
3. This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.
4. Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
5. cULus Listed as corrosion resistant.
6. Other colors are available on request with the same Listings and Approvals as the standard colors.
7. Sprinklers of Ultra-High temperature rating are intended for use inside ovens, dryers, or similar enclosures with normal operating temperatures above 300 °F (149 °C). Where the ambient temperature around the Ultra-High temperature rated sprinkler is significantly reduced below 300 °F (149 °C), the response time of the Ultra-High temperature rated sprinkler may be severely retarded.
8. CE Certified, Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001, and EC-certificate of constancy of performance 0832-CPR-G0021.
9. The 1/2" NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.
10. MED Certified, Standard EN 12259-1, EC-certificate 0832-MED-1003.
11. Approved according to China GB Standard.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1.)

cULus Listing Requirements:

The Viking Micromatic® Standard Response Upright Sprinkler VK200 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light, Ordinary, and Extra Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray upright sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

Form No. F_032814 19.10.14 Rev 19.2

VIKING®

TECHNICAL DATA

MICROMATIC® STANDARD RESPONSE UPRIGHT SPRINKLER VK200 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

Approval Chart 2 (FM)

Micromatic® Standard Response Upright Sprinklers
Maximum 175 PSI (12 bar) WWP

KEY: Temperature, Finish, A1X - Escutcheon (if applicable)

Sprinkler Base Part Number[1]	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals[3] (Refer also to Design Criteria below.)
		NPT	BSPT	U.S.	metric[2]	Inches	mm	
Standard Orifice								
18268[7]	VK200	1/2"	15 mm	8.0	115.2	2-1/4"	57	A1, B2, C1, D3
18263	VK200	3/4"	20 mm	8.0	115.2	2-1/4"	57	A1, B2, C1, D3
18266	VK200	--	20 mm	8.0	115.2	2-1/4"	57	A1, B2, C1, D3
20377[8]	VK200	--	20 mm	8.0	115.2	2-1/4"	57	E4
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)								
10220[7]	VK200	1/2"	15 mm	8.0	115.2	2-1/4"	57	A1, B2, C1, D3
10141	VK200	3/4"	20 mm	8.0	115.2	2-1/4"	57	A1, B2, C1, D3
10169	VK200	--	20 mm	8.0	115.2	2-1/4"	57	A1, B2, C1, D3

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), and 360 °F (182 °C)

B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)

C - 500 °F (260 °C)[5]

D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), 360 °F (182 °C), and 500 °F (260 °C)[5]

E - 155 °F (68 °C), 200 °F (93 °C), 286 °F (141 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester[4], and Black Polyester[4]

2 - Wax-Coated Brass (corrosion resistant)

3 - ENT[6]

4 - Brass and Chrome

Footnotes

[1] Base part number is shown. For complete part number, refer to Viking's current price schedule.

[2] Metric K-factor shown is for use when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

[3] This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.

[4] Other colors are available on request with the same Approvals as the standard colors.

[5] Sprinklers of Ultra-High temperature rating are intended for use inside ovens, dryers, or similar enclosures with normal operating temperatures above 300 °F (149 °C). Where the ambient temperature around the Ultra-High temperature rated sprinkler is significantly reduced below 300 °F (149 °C), the response time of the Ultra-High temperature rated sprinkler may be severely retarded.

[6] FM approved as corrosion resistant.

[7] The 1/2" NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.

[8] Approved according to China GB Standard.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2.)

FM Approval Requirements:

The Viking Micromatic® Standard Response Upright Sprinkler VK200 is is FM Approved as standard response **Non-Storage** upright sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM Installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

Form No. F_032814 19.10.14 Rev 19.2

Replaces Form No. F_032814 Rev 19.1
(Revised China Approval; removed 20381)

VIKING®	TECHNICAL DATA	MICROMATIC® STANDARD RESPONSE PENDENT SPRINKLER VK102 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

1. DESCRIPTION

The Viking Micromatic® Standard Response Pendent VK102 Sprinkler is a small, thermosensitive, glass-bulb spray sprinkler available in several different finishes and temperature ratings to meet design requirements. The special Polyester, and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive environments and are listed/approved as indicated in the Approval Charts.

Viking standard response sprinklers may be ordered and/or used as open sprinklers (glass bulb and pip cap assembly removed) on deluge systems. Refer to Ordering Instructions.

2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

FM Approved: Classes 2001, 2002, 2015, 2017, 2043

VdS Approved: Certificate G414006 & G414004

LPCB Approved

CE: Standard EN 12259-1, DOP_Sprinklers_LPCB_5-2-19 & DOP_VK102WAX_2-12-19

MED Certified: Standard EN 12259-1, EC-certificate 0832-MED-1003

China Approval: Approved according to China GB standard.

NOTE: Other International approval certificates are available upon request.
Refer to Approval Charts and Design Criteria for listing and approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:
Minimum Operating Pressure: 7 psi (0.5 bar)*
Maximum Working Pressure: 175 psi (12 bar) wwp
Factory tested hydrostatically to 500 psi (34.5 bar)
Thread size: 1/2" NPT, 15 mm BSPT
Nominal K-factor: 5.6 U.S. (80.6 metric**)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Overall Length: 2-1/4" (57 mm)

* cULus Listing, FM Approval, and NFPA 13 Installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

**Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Material Standards:
Frame Casting: Brass UNS-C84400 or QM Brass
Deflector: Phosphor Bronze UNS-C51000 (Not for FM Approval) or Copper UNS-C19500
Bulb: Glass, nominal 5 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT coated Sprinklers: Belleville Spring - Exposed, Screw and Pipcap - ENT plated.
Ordering Information: Refer to Table 1

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

Form No. F_031414 20.10.20 Rev 20.1

Replaces Form No. F_031414 Rev 19.2
(Revised CE approval)

VIKING®

TECHNICAL DATA

MICROMATIC® STANDARD RESPONSE PENDENT SPRINKLER VK102 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

7. AVAILABILITY

The Viking Micromatic® Standard Response Upright Sprinkler VK100 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: ORDERING INFORMATION
Instructions: Using the sprinkler base part number,
(1) add the suffix for the desired Finish
(2) add the suffix for the desired Temperature Rating.

Sprinkler Base Part No.	Size		1: Finishes		2: Temperature Ratings				
	NPT Inch	BSPT mm	Description	Suffix[1]	Nominal Rating	Bulb Color	Hazard Classification	Max. Ambient Ceiling Temperature[2]	Suffix
12987	1/2	--	Brass	A	135 °F (57 °C)	Orange	Ordinary	100 °F (38 °C)	A
12989	--	15	Chrome	F	155 °F (68 °C)	Red	Ordinary	100 °F (38 °C)	B
20229	--	15	White Polyester [3,5]	M-/W	175 °F (79 °C)	Yellow	Intermediate	150 °F (65 °C)	D
			Black Polyester [3,5]	M-/B	200 °F (93 °C)	Green	Intermediate	150 °F (65 °C)	E
			Wax	C	212 °F (100 °C)	Green	Intermediate	150 °F (65 °C)	M
			Wax over Polyester	V-/W	286 °F (141 °C)	Blue	High	225 °F (107 °C)	G
			ENT [3,4,5]	JN	360 °F (182 °C)	Mauve	Extra High	300 °F (149 °C)	H
					500 °F (260 °C)	Black	Ultra High[6]	465 °F (240 °C)	L

Example: 12987MB/W = VK102 with White Polyester Finish and 155 °F (68 °C) Nominal temperature rating. This sprinkler is to be installed into an area with a maximum ambient temperature of 100 °F (38 °C) meaning if the area will experience temperatures above the maximum ambient rating, you shall use a higher temperature-rated sprinkler.

Corrosion Resistant Coatings[5]

- White Polyester and Black Polyester in all temperature ratings.
- ENT in all temperature ratings except 135 °F (57 °C).
- Wax-Coated Brass and Wax over Polyester[7] for sprinklers with the following temperature ratings:
  155 °F (68 °C) Lt. Brown Wax | 175 °F (79 °C) Brown Wax | 200 °F (93 °C) Brown Wax | 286 °F (141 °C) Dk. Brown Wax[7]

Accessories

Sprinkler Wrenches (see Figure 1):

A. Standard Wrench: Part No. 21475M/B
B. Standard Wrench for Wax Coated Sprinklers: Part No. 10896W/B
C. Socket Wrench for Recessed Pendent Sprinklers: Part No. 13655W/B (A 1/2" ratchet is required, not available from Viking)
D. Socket Wrench for Wax Coated Sprinklers: Part No. 13577W/B (A 1/2" ratchet is required, not available from Viking)
E. Optional Protective Sprinkler Cap Remover/Escutcheon Installer Tool[8]: Part No. 15915

Sprinkler Cabinet:

A. Up to 6 sprinklers: Part number 01724A (available since 1971).
B. 6-12 Sprinklers: Part number 01725A (available since 1971).

Footnotes

1. Where a dash (-) is shown in the Finish suffix designation, insert the desired Temperature Rating suffix. See example above.
2. Based on NFPA 13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
3. UL Listed as corrosion resistant.
4. FM Approved corrosion resistant.
5. The corrosion resistant and corrosion proofing coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart(s). These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester and ENT coatings. For ENT coated automatic sprinklers, the waterway is coated.
6. Sprinklers of Ultra-High temperature rating are intended for use inside ovens, dryers, or similar enclosures with normal operating temperatures above 300 °F (149 °C). Where the ambient temperature around the Ultra-High temperature rated sprinkler is significantly reduced below 300 °F (149 °C), response time may be severely retarded
7. Wax melting point is 170 °F (76 °C) for 286 °F (141 °C) temperature rated sprinklers. For more inforamation regarding wax coatings, refer to Bulletin Form No. F_010201.
8. Allows use from the floor by attaching a length of 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to Bulletin F_051808.

VIKING®	TECHNICAL DATA	MICROMATIC® STANDARD RESPONSE PENDENT SPRINKLER VK102 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

Figure 1: Sprinkler Wrenches

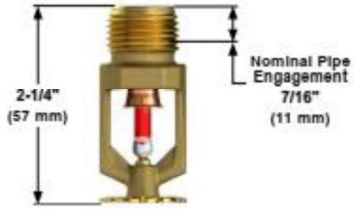

Figure 2: Sprinkler Dimensions

VIKING®

TECHNICAL DATA

MICROMATIC® STANDARD RESPONSE PENDENT SPRINKLER VK102 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
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Approval Chart 1 (UL)

Micromatic® Standard Response Pendent Sprinkler VK102
Maximum 175 PSI (12 bar) WWP

KEY: Temperature, Finish, A1X ← Escutcheon (if applicable)

Sprinkler Base Part Number[1]	SIN	Thread Size		Nominal K-factor		Overall Length		Listings and Approvals[3] (Refer also to UL Design Criteria.)					
		NPT	BSPT	U.S.	metric[2]	Inches	mm	cULus[4]	VdS	LPCB	CE[8]	MED[9]	China Approval
12987	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B3, B1Y, C4, D2, E5, G5Z	A1	A1, B3, B1Y	F1, G1Y, B4[11]	F2X	--
12989	VK102	--	15 mm	5.6	80.6	2-1/4"	57	A1, B3, B1Y, C4, D2, E5, G5Z	A1	A1, B3, B1Y	F1, G1Y, B4[11]	F2X	--
20229[10]	VK102	--	15 mm	5.6	80.6	2-1/4"	57	E6	--	--	--	--	E6
NOTICE - Product Below - No longer offered.													
10139	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B3, B1Y, C4, D2, E5, G5Z	--	--	--	--	--
10173	VK102	--	15 mm	5.6	80.6	2-1/4"	57	A1, B3, B1Y, C4, D2, E5, G5Z	A1	A1, B3, B1Y	--	F2X	--
18020	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B3, B1Y, C4, D2, E5, G5Z	A1	A1, B3, B1Y	F1, G1X	F2X	--

Approved Temperature Rating Codes

A = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), and 360 °F (182 °C)
B = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
C = 286 °F (141 °C)
D = 500 °F (260 °C)[7]
E = 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), 360 °F (182 °C), and 500 °F (260 °C)[7]
F = 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), and 360 °F (182 °C)
G = 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)

Approved Finish Codes

1 = Brass, Chrome, White Polyester[5,6] and Black Polyester[5,6]
2 = Brass and Chrome
3 = Wax-Coated Brass and Wax Over Polyester[6]
4 = High Temperature 200 °F (93 °C) Wax Coating (corrosion resistant); maximum ambient temperature allowed at ceiling = 150 °F (65 °C)
5 = ENT[5]
6 = Chrome

Approved Escutcheon Codes

X = Recessed with the Viking Model E-1, E-2, or E-3 Recessed Escutcheon
Y = Standard surface-mounted escutcheon or recessed with the Viking Model E-1, E-2, or E-3 Recessed Escutcheon
Z = Standard surface-mounted escutcheon or recessed with the Viking Model E-1 Recessed Escutcheon

Footnotes

1. Base part number is shown. For complete part number, refer to Viking's current price schedule.
2. Metric K-factor shown is for use when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
3. This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.
4. Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
5. cULus Listed as corrosion resistant.
6. Other colors are available on request with the same Listings and Approvals as the standard colors.
7. Sprinklers of Ultra-High temperature rating are intended for use inside ovens, dryers, or similar enclosures with normal operating temperatures above 300 °F (149 °C). Where the ambient temperature around the Ultra-High temperature rated sprinkler is significantly reduced below 300 °F (149 °C), the response time of the Ultra-High temperature rated sprinkler may be severely retarded.
8. CE: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-0021.
9. MED Certified, Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003 and 0832-MED-1008.
10. Approved according to China GB standard.
11. CE: Standard EC 12259-1, Declaration of Performance DOP_Sprinklers_LPCB_5-2-19 & DOP_VK102WAX_2-12-19

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1.)

cULus Listing Requirements:

The Viking Micromatic® Standard Response Pendent Sprinkler VK102 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light, Ordinary, and Extra Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray pendent sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

Form No. F_031414 20.10.20 Rev 20.1

VIKING®

TECHNICAL DATA

MICROMATIC® STANDARD RESPONSE PENDENT SPRINKLER VK102 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

Approval Chart 2 (FM)

Micromatic® Standard Response Pendent Sprinkler VK102
Maximum 175 PSI (12 bar) WWP

KEY: Temperature, Finish, Escutcheon (if applicable) — A1X

Sprinkler Base Part Number[1]	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals[5] (Refer also to Design Criteria below.)
		NPT	BSPT	U.S.	metric[2]	Inches	mm	
12987	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B2, C3, D1, E4, G1Y, G4Z
12989	VK102	--	15 mm	5.6	80.6	2-1/4"	57	A1, B2, C3, D1, E4, G1Y, G4Z
20229[7]	VK102	--	15 mm	5.6	80.6	2-1/4"	57	E5
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)								
10139	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B2, C3, D1, E4, G1Y, G4Z
10173	VK102	--	15 mm	5.6	80.6	2-1/4"	57	A1, B2, C3, D1, E4, G1Y, G4Z
18020	VK102	1/2"	15 mm	5.6	80.6	2-1/4"	57	A1, B2, C3, D1, G1Y

Approved Temperature Rating Codes

A = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 212 °F (100 °C), 286 °F (141 °C), and 360 °F (182 °C)
B = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 212 °F (100 °C)
C = 286 °F (141 °C)
D = 500 °F (260 °C)[5]
E = 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), 360 °F (182 °C), and 500 °F (260 °C)[5]
F = 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
G = 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)

Approved Finish Codes

1 = Brass, Chrome, White Polyester[4,6] and Black Polyester[4,6]
2 = Wax-Coated Brass (corrosion resistant)
3 = High Temperature 200 °F (93 °C) Wax Coating (corrosion resistant); maximum ambient temperature allowed at the ceiling = 150 °F (65 °C)
4 = ENT[6]
5 = Chrome

Approved Escutcheon Codes

Y = Standard surface-mounted escutcheon or recessed with the Viking Model E-1, E-2, or E-3 Recessed Escutcheon
Z = Standard surface-mounted escutcheon or recessed with the Viking Model E-1 Recessed Escutcheon

Footnotes

1. Base part number is shown. For complete part number, refer to Viking's current price schedule.
2. Metric K-factor shown is for use when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
3. This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.
4. Other colors are available on request with the same Approvals as the standard colors.
5. Sprinklers of Ultra-High temperature rating are intended for use inside ovens, dryers, or similar enclosures with normal operating temperatures above 300 °F (149 °C). Where the ambient temperature around the Ultra-High temperature rated sprinkler is significantly reduced below 300 °F (149 °C), the response time of the Ultra-High temperature rated sprinkler may be severely retarded.
6. FM approved as corrosion resistant.
7. Approved according to China GB standard.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2.)

FM Approval Requirements:

The Viking Micromatic® Standard Response Pendent Sprinkler VK102 is is FM Approved as standard response **Non-Storage** pendent sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

Form No. F_031414 20.10.20 Rev 20.1

VIKING®

TECHNICAL DATA

MICROMATIC® STANDARD RESPONSE PENDENT SPRINKLER VK102 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page www.vikinggroupinc.com

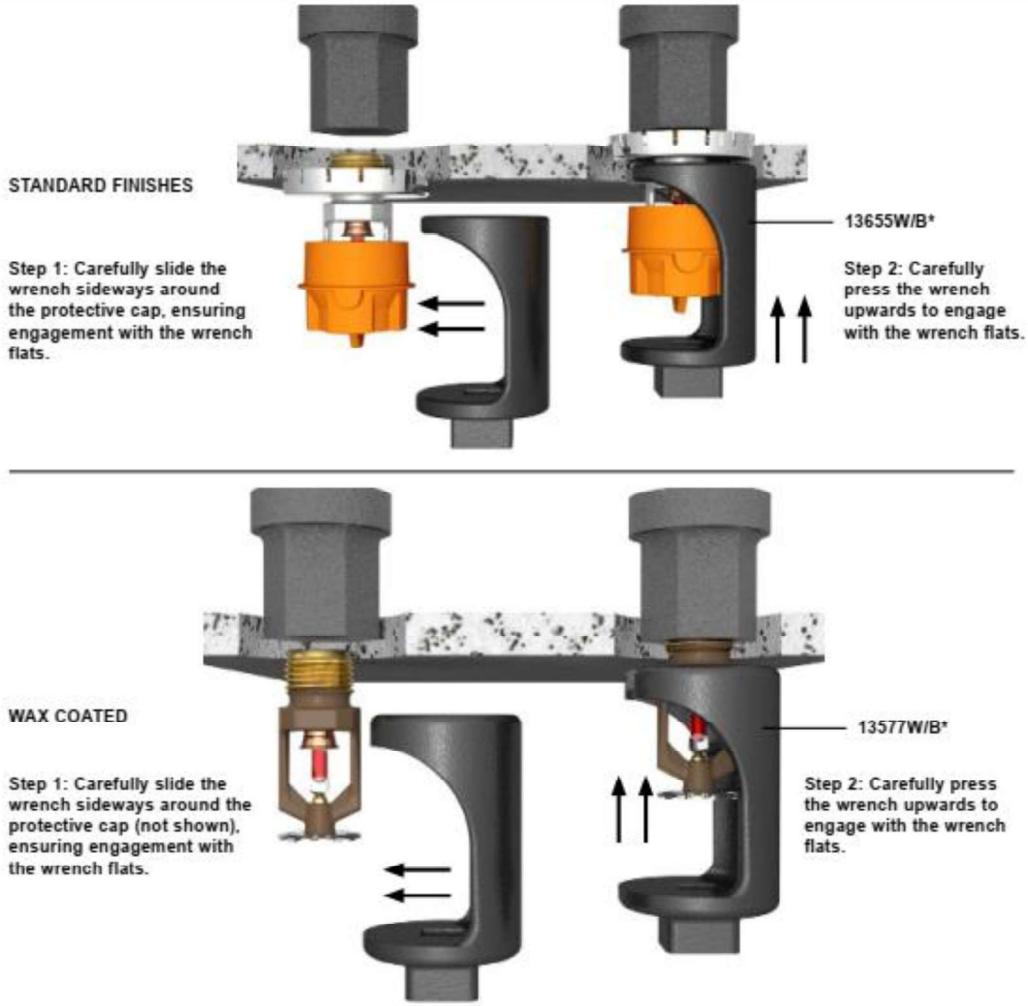

Figure 3: Installation with Recessed Wrenches

*Requires a 1/2 ratchet - not available from Minimax.

Form No. F_031414 20.10.20 Rev 20.1

VIKING®	TECHNICAL DATA	MICROMATIC® STANDARD RESPONSE PENDENT SPRINKLER VK102 (K5.6)

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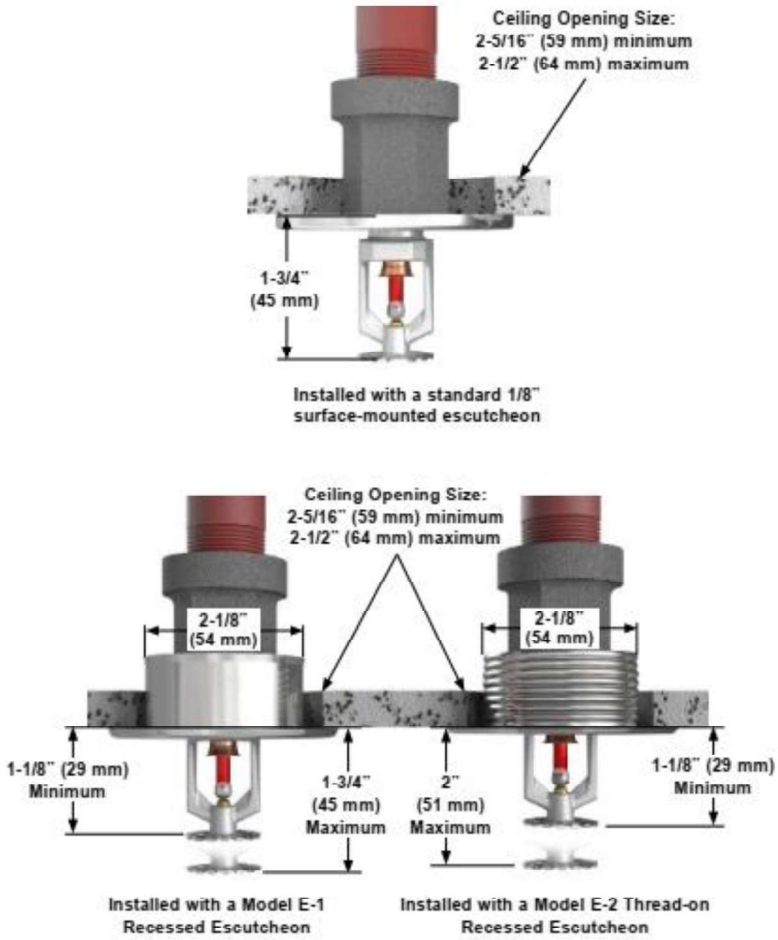

Figure 4: Installation Dimensions with Escutcheons

VIKING® **TECHNICAL DATA** **WATER MOTOR ALARMS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

The Viking water motor alarms are mechanical devices actuated by a flow of water. They are designed to sound a continuous alarm while a sprinkler system operates. An alarm is a required component of every sprinkler system having more than 20 sprinklers.

A. Features

1. The water motor alarms are tapped 3/4" NPT on the inlet and 1" NPT on the drain outlet.
2. The water motor alarm package includes a drive shaft 16-3/4" (425 mm) long for walls 14" (356 mm) thick or less. A special extension shaft is available for walls up to 30-1/4" (768 mm) thick.
3. The package also includes the required 3/4" (20 mm) NPT strainer for installation on the alarm line.
4. Rated water working pressure of Model F-2 is 250 PSI (17.2 bar).

B. Accessories: (order separately)

1. Extension Mounting Cup: Viking Part Number 05957B, Material: 14-Gauge Cold Rolled Steel, UNS-G10080, coated with black E-coat. The extension mounting cup is required when the wall thickness is less than 3" (76.2 mm). Refer to "INSTALLATION" instructions. See Figure 2.
2. Closure Plate: For use with Model F-2 only, Viking Part Number 05820B, Material: 16-Gauge Galvanized Steel, UNS-G10080. The closure plate is required when the Model F-2 Water Motor Alarm gong is mounted on an irregularly surfaced wall. It serves to prevent birds from entering the inside of the gong. The closure plate also serves as a mounting plate for sheet metal walls. Refer to "INSTALLATION" instructions. See Figure 2.
3. Special Extension Shaft: Viking Part Number 03312B, Material: Stainless Steel, UNS-S30400. The extension shaft is required when the F-2 or G-2 Water Motor Alarm is installed on walls from 14" (356 mm) to 30-1/4" (768 mm) thick.

2. LISTINGS AND APPROVALS

Viking Technical Data may be found on The Viking Corporation's Web site at http://www.vikinggroupinc.com. The Web site may include a more recent edition of this Technical Data Page.

Model F-2:

cULus Listed - VPLX

FM Approved - Water Motor Gongs

LPCB Approved

CE - Standard EN 12259-4, EC-certificate of conformity 1725-CPD-H0001

New York City Board of Standards and Appeals - Calendar No. 219-76-SA

Model G-2:

VdS

CE - Standard EN 12259-4, EC-certificate of conformity 1725-CPD-H0001
The 07862 and 07868 Water Motor Alarms Model F-2 and Model G-2 conform to the provision of EN12259-4 standard.
EN12259-4 approvals are provided by:FM Approvals Ltd. 1 Windsor Dials Windsor, Berkshire, UK. SL4 1 RS
Approval Certificate No. issued February 15, 2010.

3. TECHNICAL DATA

Specifications

Available since 1991
Shipping Weight: Model F-2: 11 lbs. (5.0 kg); Model G-2: 13 lbs. (5.9 kg)
Model F-2 Water working pressure: Rated to 300 psi (21 bar); Model G-2 Water working pressure: 175 psi (12 bar)

Material Standards (See Figure 3)

Viking E-coat Spec: SPF02 W01

Ordering Information

Model F-2, Viking Part No. 07862
Model G-2, Viking Part No. 07868

4. INSTALLATION

Locate the water motor on an exterior wall as close as practical to the valve being monitored for water flow. A 3/4" (20 mm) strainer (included) is required on the alarm line as close as possible to the alarm outlet of the valve being monitored for water flow (or outlet of the retard chamber, if used). The location must be easily accessible for cleaning.

Form No. F_082789 Rev 15.1

VIKING® **TECHNICAL DATA** **WATER MOTOR ALARMS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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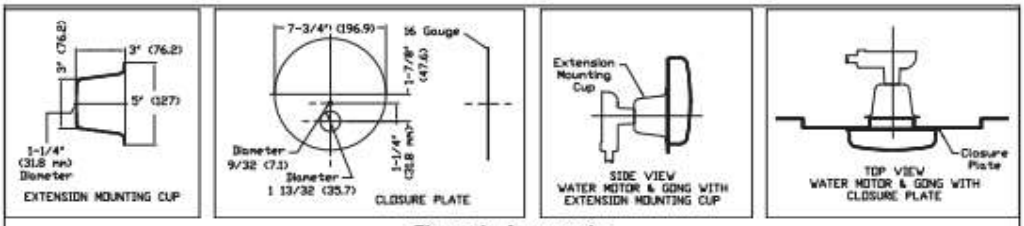


Figure 1: Accessories

A. Cut a 1-7/16" (36.5 mm) minimum to 1-5/8" (41.3 mm) maximum diameter hole in the building wall to accommodate the 3/4" (20 mm) galvanized spacer pipe. (Note: Spacer pipe is NOT included in Water Motor Alarm Package). The hole through the wall must be level or pitched slightly downward toward the water motor.
B. Measure the wall thickness.
C. Cut and thread the spacer pipe to a length equal to: The wall thickness minus 1" (25.4 mm). If the extension mounting cup is used, add an additional 3" (76 mm) to the spacer pipe.
D. Cut the drive shaft (10) to a length equal to: The total wall thickness plus 2-3/4" (70 mm). If extension mounting cup is used, add an additional 3" (76 mm).
E. File the drive shaft to provide a 3/32" (2.4 mm) x 450 chamfer on both corners of both ends. File off all burrs and insert the drive shaft into the hole of the striker arm shaft.
F. Slide the spacer pipe over the shaft and thread the end of the spacer pipe into the gong support assembly coupling (12).
G. Slide the closure plate (if used) over the free end of the spacer pipe, up to the back of the gong. If desired, the closure plate may be fastened to the gong support by using the 9/32" (7.14 mm) diameter hole in the gong support. Use only a flat or round headed fastener that will not interfere with striker arm movement.
H. Position the support assembly on the exterior wall surface by sliding the free threaded end of the spacer pipe into the hole from outside the building.
I. On the inside surface of the wall: Slide the wall plate provided (9), over the free threaded end of the spacer pipe. (If an extension mounting cup is used, place it over the end of the spacer pipe with the flared end toward the wall before sliding the wall plate into position).

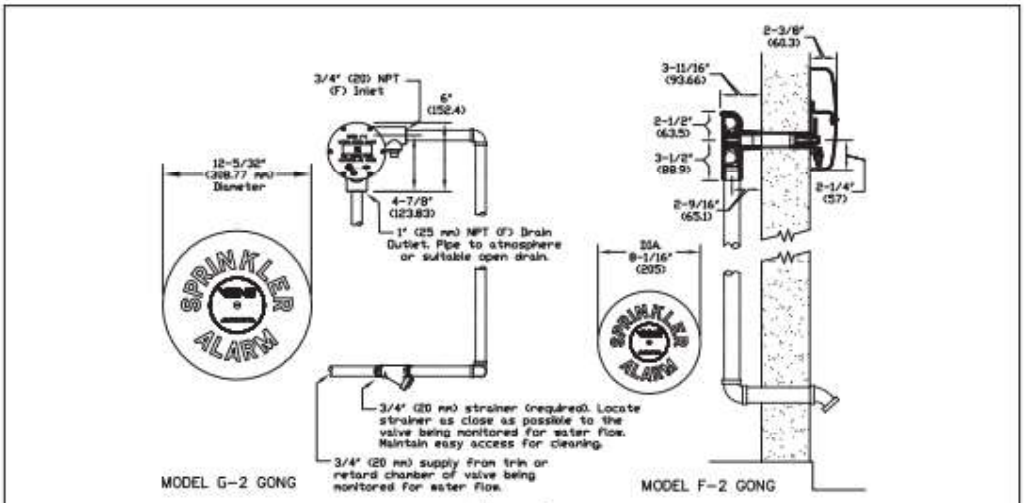


Figure 2

Form No. F_082789 Rev 15.1

VIKING® TECHNICAL DATA WATER MOTOR ALARMS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

J. Remove the plastic thread protectors from the threaded openings in the body of the water motor.
K. Attach the water motor assembly by threading the body (3) onto the free threaded end of the spacer pipe. The chamfered ends of the drive shaft allow it to slide into position as the water motor body is threaded onto the spacer pipe. When the assembly is properly tightened, the water motor should be positioned with the 1" (25 mm) NPT drain outlet facing downward and the 3/4" (20 mm) NPT alarm line inlet horizontal. See Figures 1 and 3.
L. Attach the gong, the flat washer, and the gong label (16, 17, and 18) to the gong support installed on the exterior surface of the wall, with the 5/16-18 x 12" (13 mm) screw (19). Note: The flat washer must be installed between the gong and the gong support (17).
M. With galvanized, brass, or other approved corrosion-resistant piping, not less than 3/4" (20 mm) diameter, connect the water motor inlet to the alarm outlet of the waterflow detecting device. A 3/4" (20 mm) strainer (included) is required on the alarm line as close as possible to the alarm outlet of the waterflow detecting device (or outlet of the retard chamber if used). The location must be easily accessible for cleaning.
N. The drain outlet of the impeller housing must discharge to an open drain. Care shall be taken to keep the drain line clean at all times.
O. Note: A water motor drain line that:
   1. Has too many fittings, and/or
   2. Has a very short length of pipe between the 1" (25 mm) outlet and the first elbow in the water motor drain pipe, and/or
   3. Is very long may result in slow drainage and reduced water motor speed. This condition can be remedied by increasing the drain pipe diameter, increasing the length of pipe to the first elbow, and/or pitching the pipe toward the discharge location.

5. OPERATION (See Figure 3)

When a sprinkler system is activated, water flows from the alarm outlet of the valve, through the 3/4" (20 mm) strainer and alarm line piping, into the inlet of the water motor. From the 1/8" inlet orifice, the water flows through a nozzle (4), which restricts the flow into a pressurized stream directed onto the impeller (7). Force from the water stream turns the impeller and drive shaft (10), causing the striker arm (20) to rotate. The striker (25) impacts against the gong (16), producing a continuous alarm. A minimum of 5 PSI (.34 bar) is required at the nozzle to cause a continuous alarm. When properly installed, the Model F-2 Water Motor Alarm produces the required 90 decibel output and the Model G-2 produces 100 decibels. After passing through the water motor, the water is discharged through a 1" (25 mm) drain outlet in the bottom of the impeller housing. The discharged water must be piped through the wall to atmosphere or to a suitable open drain.

6. INSPECTIONS, TESTS AND MAINTENANCE

Weather-resistant materials are used in the construction of the water motor alarm. At regular intervals, examine and test the water motor to ensure that the nozzle and drain line are clean and free of obstruction, and that the alarm functions properly. Also, at regular intervals and before disassembly of the water motor, clean and inspect the alarm line strainer located at the alarm outlet of the waterflow detecting device, or the outlet of the retard chamber, if used. (Note: Some retard chambers may be equipped with a strainer built in). For minimum maintenance and inspection requirements, refer to NFPA 25. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed. Before proceeding with disassembly of the water motor alarm, notify the Authority Having Jurisdiction and occupants of the area covered by the system affected. Take all appropriate precautions. The water motor alarm will be disabled during disassembly.

A. Water Motor Disassembly (See Figure 3)

1. Isolate the water motor alarm by closing the alarm line valve in the trim of the waterflow detecting device. (Refer to appropriate technical data for the system used.)
2. Remove pipe plug (5).
3. Remove all round head machine screws (1) from the water motor cover.
4. Separate the cover (2) and the gasket (6) from the housing (3).
5. Remove the impeller (7).
6. Inspect and, if necessary, carefully clean the nozzle (4) with a wire or pipe cleaner brush.
7. Flush the nozzle way and drain line with water or compressed air.

B. Water Motor Re-Assembly

1. Re-install the pipe plug (5).
2. Re-install the impeller (7).
3. Replace cover gasket (6) and attach cover (2) by using round head machine screws (1).
4. Open the alarm line valve.
5. Test the water motor alarm.
6. When test is complete and water motor alarm operation is satisfactory, place the alarm line valve in the proper "alarm" position. Reset and return the affected systems to service.

7. AVAILABILITY

Viking Water Motor Alarms are available through a network of domestic and international distributors. See the Viking Corp. Web site for closest distributor or contact The Viking Corporation.

8. GUARANTEES

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

Form No. F_082789 Rev 15.1

VIKING® **TECHNICAL DATA** **WATER MOTOR ALARMS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

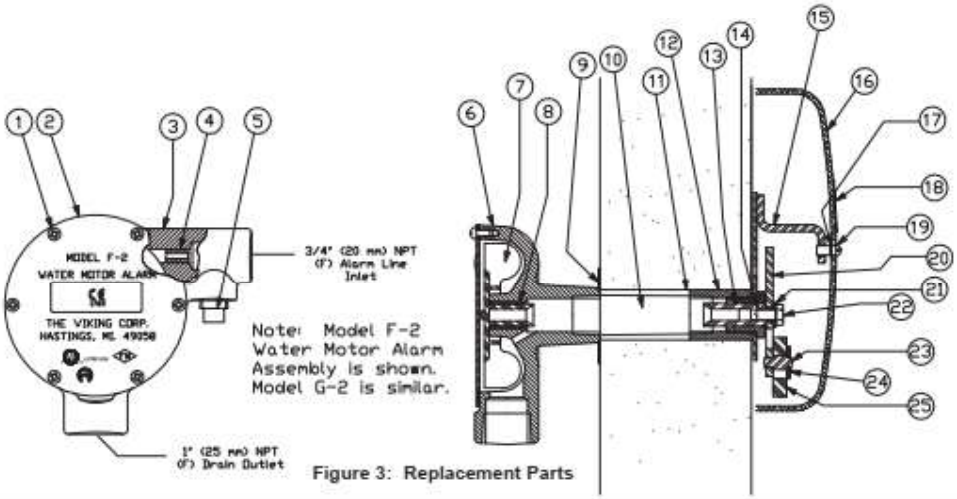


Figure 3: Replacement Parts

ITEM NO.	PART NUMBER F-2	PART NUMBER G-2	DESCRIPTION	MATERIAL	NO. REQ'D
1	*	*	Screw, R. H. Self-tap #10-24 x 3/8" lg.	Zinc Plated Steel	6
2	07867	07870	Cover	Steel	1
3	*	*	Housing	Cast Iron	1
4	*	*	Nozzle	Brass	1
5	01925S	01925S	1/2" Pipe Plug	Cast Iron	1
6	02550B	02550B	Cover Gasket	Cellulose/Nitrile/Glass Blend	1
7	02547C	02547C	Impeller	Delrin	1
8	*	*	Bearing	Brass: Sintered Bronze	1
9	05603A	05603A	Wall Plate	Galvanized Steel	1
10	05604B	05604B	Drive Shaft	Stainless Steel	1
11	--	--	3/4" Pipe (C.O.J.) not furnished	Galvanized Steel	1
12	*	*	Coupling	Brass	1
13	02556B	02556B	Striker Arm Shaft	Celcon Glass Filled	1
14	*	*	Bearing	Brass	1
15	*	*	Gong Support	Stainless Steel	1
16	05821C	06508C	Gong	Aluminum	1
17	02766A	02766A	Flat Washer, 11/32" ID x 11/16" ID x 1/16"	Stainless Steel	1
18	05768A	06505C	Gong Label	Aluminum (F-2), Vinyl (G-2)	1
19	--	--	Screw, B.H. Slotted, 5/16-18 x 1/2" lg.	Stainless Steel	1
20	*	*	Striker Arm	Stainless Steel	1
21	--	--	Flat Washer, 11/32" ID x 11/16" OD x 1/16"	Stainless Steel	1
22	--	--	Screw, H.H. Self-tap 5/16-18 x 1/2" lg.	Zinc Plated Steel	1
23	*	*	Striker Pin	Stainless Steel	1
24	*	*	Striker Arm Washer	Stainless Steel	1
25	*	*	Striker	Canvas Phenolic	1
--Indicates replacement part not available					
*Indicates replacement part only available in a Sub-Assembly listed below					
SUB-ASSEMBLIES					
1-8	07863	07869	Motor Assembly		
20, 23-25	02558B	02558B	Striker Arm Assembly		
12-15, 20-25	05606C	06506C	Support Assembly		

Form No. F_082789 Rev 15.1

VIKING

Alarm Devices

Waterflow Alarm Switch

VSR-EU

Technical Features

- **Service pressure** : Up to 31 bar (450 psi) (16 bar (232 psi) per LPCB, VdS and CE)
- **Flow Sensitivity** :
  15-38 lpm (4-10 gpm) - UL
  30-57 lpm (8-15 gpm) - CE
- **Maximum Surge** : 5.5 m/s, 18 ft/s
- **Switch Contacts** : Two sets of Single Pole Double Throw (SPDT) Form C switch contacts.
  10.0 A @ 125/250 VAC and 2.0 A @ 30 VDC on resistive load.
- **Enclosure** :
  Cover - Die cast with textured red powdercoat finish
  Housing - Cast aluminium
- **Conduit Entrance** : Requires NEMA Type 4 conduit hub for outdoor installations. Two conduit entrances provided for DN15/ ½".
- **Environmental Specifications** : Indoor or outdoor use ; Temperature Range : 4.5°C (40°F) to 49°C (120°F) ; NEMA 4/ IP45 Rated Enclosure - when used with proper conduit fittings. (Not for use in hazardous locations)
- **Tamper Protection** : Cover held in place by two tamper resistant screws which require a special key for removal (reference : VSRFKEY). A field installable cover tamper switch is available as an option which may be used to indicate unauthorized removal of the cover.

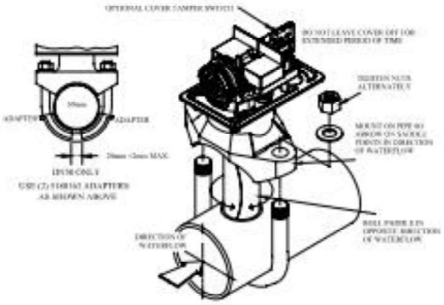
Retard Adjustment :

The delay can be adjusted by rotating the retard adjustment knob from 0 to the maximum setting. The time delay should be set at the minimum required to prevent false alarms.
Note: A condition of CE approval of this product requires that it has a maximum retard of 30 seconds.

WF Alarm Switch - VSR-EU — Physical Data

Reference	Pipe Size		Installation
	Nominal (metric/inch)	O.D. (mm)	Hole Size (mm/inch)
VSR0200CE	DN50 / 2	60.3	33.0 ± 2 / 1.25 + .125/-.062
VSR0250CE	DN65 / 2½	73.0	33.0 ± 2 / 1.25 + .125/-.062
VSR0250CE	DN65 / 2½	76.1	33.0 ± 2 / 1.25 + .125/-.062
VSR0300CE	DN80 / 3	88.9	50.8 ± 2 / 2.00 ± .125
VSR0400CE	DN100 / 4	114.3	50.8 ± 2 / 2.00 ± .125
VSR0500CE	DN125 / 5	141.3	50.8 ± 2 / 2.00 ± .125
VSR0600CE	DN150 / 6	165.1	50.8 ± 2 / 2.00 ± .125
VSR0600CE	DN150 / 6	168.3	50.8 ± 2 / 2.00 ± .125
VSR0800CE	DN200 / 8	219.1	50.8 ± 2 / 2.00 ± .125

Other sizes and longer retard times are available on models without CE approval. Contact Viking for further details.



Worldwide Fire Protection

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30-11-2016 Datasheet replaced version of 26-03-2013 (Updated Datsheet dimensionsion)

FIREKING

VIKING

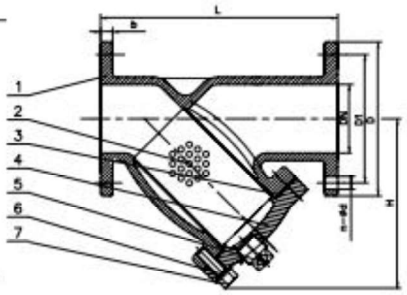
Y-Strainer - Flanged

YSF

Strainers

Technical Features

- Sizes available (Nominal): DN50/2", DN65/2½", DN80/3", DN100/4", DN150/6", DN200/8", DN250/10" and DN300/12"
- Pressure data:
  Working pressure: 21 bar (300 psi)
- Temperature data:
  Working temperature: 0°C - 80°C
- Finish: Fusion bonded epoxy coated internal and external
- Connections: Flange diameter and thickness according to ANSI B16.1 Class 125 or EN1092-2 PN16



Y-Strainer - Flanged - YSF

Physical Data

Nominal Pipe Size		Dimensions (mm)								Drain Plug	Screen Size (mm)	Reference*		Weight (kg)
Metric	inch	L	D	b	H	D1		n-ØL		BSP Thread		ANSI	PN16	
						ANSI	PN16	ANSI	PN16					
DN50	2"	200	152	16	155	120.7	125	4-Ø19.1		1"	1.5	YSF-0200	YSF-0200PN	8.7
DN65	2½"	254	178	17.5	165	139.7	145	4-Ø19.1		1"	1.5	YSF-0250	YSF-0250PN	12.2
DN80	3"	257	191	19	180	152.4	160	4-Ø19.1	8-Ø19.1	1"	1.5	YSF-0300	YSF-0300PN	13.8
DN100	4"	308	229	24	229	190.5	180	8-Ø19.1	8-Ø19.1	1"	1.5	YSF-0400	YSF-0400PN	23.9
DN150	6"	470	279	25.5	311	241.3	240	8-Ø22.2	8-Ø23	1½"	1.5	YSF-0600		43.8
DN200	8"	549	343	28.5	394	298.5	295	8-Ø22.2	12-Ø23	1½"	2	YSF-0800	YSF-0800PN16	75.4
DN250	10"	654	406	30.5	487	362.0	355	12-Ø25.5	12-Ø28	2"	2	YSF-1000	YSF-1000PN16	109.3
DN300	12"	759	483	32	547	431.8	410	12-Ø25.5	12-Ø28	2"	2	YSF-1200	YSF-1200PN16	173.1

* Valve flange drilling tabs and location of bolt holes and pitch circle diameter allows mating with the following flange types :

ANSI – ANSI B16.1 Class 125 | PN16 – DIN 2501, BS 4504, EN 1092 - PN16

Y-Strainer - Flanged - YSF

Screen Data

DN		Hole Dia. (mm)	Free Flow Area (%)
inch	mm		
2"-6"	50-150	1.5	33
8"-12"	200-300	2.0	33

Y-Strainer - Flanged - YSF

Materials List

Item	Description	Material	Specification
1	Valve Body	Ductile Iron	ASTM A536 65-45-12
2	Screen	Stainless Steel	AISI 304 (Perforated)
3	Gasket	EPDM	Commercial
4	Cover	Ductile Iron	ASTM A536 65-45-12
5	Plug	Malleable Iron	Galvanized
6	Bolt	Carbon Steel	Zinc Plated
7	Flat Washer	Carbon Steel	Zinc Plated

16.03.2017 Datasheet updates the version of 07-07-2016 (Changed screen size data)

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FIREKING

VIKING

Swing Check Valve - Flanged

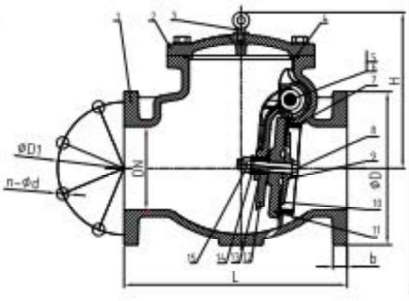
SCF

Check Valves

Technical Features

- **Sizes available (Nominal):** 2"/DN50, 2-1/2"/DN65, 3"/DN80, 4"/DN100, 6"/DN150, 8"/DN200, 10"/DN250 & 12"/DN300
- **Pressure data:**
  Working Pressure: 21 bar (300 psi).
- **Working Temperature:** 0°C to 80°C
- **Seat Type:** Bronze clapper face ring and valve body seat
- **Finish:** Fusion bonded epoxy coated interior & exterior
- **Connections:** Flange diameter and thickness according to ANSI B16.1 Class 125, EN1092-2 PN10 or EN1092-2 PN16
- **Specifications:** Complys with AWWA C508, clear water-way design.

Note: Check valves may be damaged by excessively turbulent water flow. Model SCF check valves should be installed a reasonable distance from pumps, elbows, expanders, reducers, or similar devices. Typical piping practices suggest a minimum distance of five times the pipe diameter for general use



Swing Check Valve - Flanged - SCF

Physical Data

Part number*			Nominal pipe size		Dimensions (mm)										Weight (kg)
									D1			n-ØL			
ANSI	PN10	PN16	Metric	inch	L	D	b	H	ANSI	PN16	PN10	ANSI	PN16	PN10	
SCF-0200	SCF-0200PN		DN50	2"	203	152	16	133	120.5	125		4-Ø19.1			11.2
SCF-0250	SCF-0250PN		DN65	2-1/2"	254	178	17.5	150	139.5	145		4-Ø19.1			16.7
SCF-0300	SCF-0300PN		DN80	3"	279	191	19	150	152.5	160		4-Ø19.1	8-Ø19.1		22.5
SCF-0400	SCF-0400PN		DN100	4"	330	229	24	218	190.5	180		8-Ø19.1	8-Ø19.1		34.9
SCF-0600			DN150	6"	406	279	25.5	290	241.5	240		8-Ø22.2	8-Ø23		65.2
SCF-0800	SCF-0800PN10	SCF-0800PN16	DN200	8"	495	343	28.5	330	298.5	295		8-Ø22.2	12-Ø23	8-Ø23	120.7
SCF-1000	SCF-1000PN10	SCF-1000PN16	DN250	10"	622	406	30.5	350	362	355	350	12-Ø25.4	12-Ø28	12-Ø23	180.9
SCF-1200	SCF-1200PN10	SCF-1200PN16	DN300	12"	660	483	32	375	432	410	400	12-Ø25.4	12-Ø28	12-Ø23	242.3

* Valve flange drilling (size and location of bolt holes and pitch circle diameter) allows mating with the following flange types. ** Not UL or FM

ANSI = ANSI B16.1	PN10 = DIN 2501, EN 1092 - PN10	PN16 = DIN 2501, EN 1092 - PN16

Swing Check Valve - Flanged - SCF

Materials List

Item	Description	Material	ASTM Specifications
1	Body	Ductile iron	ASTM A536 65-45-12
2	Bonnet	Ductile iron	ASTM A536 65-45-12
3	Eyebolt	Zinc plated carbon steel	
4	O-ring	NBR	Commercial
5	Hinge pin	Stainless steel	AISI 304
6	Hinge bushing	Brass	ASTM B36
7	Seat ring	Bronze	ASTM B62
8	Disc seat bolt	Stainless steel	AISI 304
9	Retainer washer	Bronze	ASTM B62
10	Disc sealing ring	EPDM	Commercial
11	Disc	Ductile iron	ASTM A536 65-45-12
12	Clapper arm	Ductile iron	ASTM A536 65-45-12
13	Stud bushing	Brass	ASTM B36
14	O-ring	NBR	Commercial
15	Nuts	Stainless steel	AISI 304

17-10-2017 Updates datasheet of 09-06-2016 (added note at end of technical features)

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FIREKING

VIKING

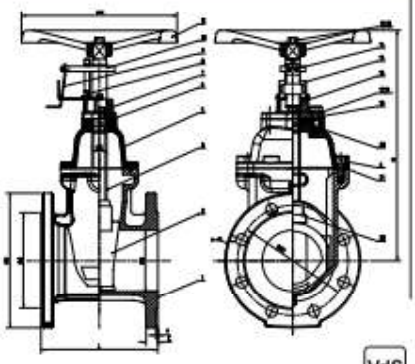
Control Valves

Non-Rising Stem (NRS) EN1171 Gate Valve - Flanged

NRF11

Technical Features

- **Sizes available (Nominal) :** DN50/2", DN65/2-1/2", DN80/3", DN100/4", DN125/5", DN150/6", DN200/8", DN250/10" and DN300/12"
- **Working Pressure :** 16 bar (232 psi)
- **Wedge type :** Resilient EPDM fully encapsulated
- **Finish :** Fusion bonded epoxy inside and outside
- **Approvals :** VdS Approved
- **Connections :** Flange diameter and thickness according to EN1092-2 PN16, and flange drilling can be in accordance with EN1092-2 PN10 for size 8"/DN200, 10"/DN250 and 12"/DN300 according to request
- **Specification :** Design and dimensions conform to EN1171
- **Supervision :** Integral bracket allows monitoring of valve in open position using supervisory switch, P/N 828482. For monitoring closed position part number NRF-SB is required



VdS

Non-Rising Stem (NRS) EN1171 Gate Valve - Flanged - NRF11

Physical Data

Reference	Nominal Pipe Size		Flange Type and Drilling	Dimensions (mm)									Weight (kg)
	Metric	inch		L(F4)	H	D	D1	d	C	T	ØM	n-ØL	
NRF11-0200PN (923433)	DN50	2"	PN10 PN16	150	282	165	125	99	19	3	180	4-Ø19	10.25
NRF11-0250PN (923432)	DN65	2-1/2"	PN10 PN16	170	290	185	145	118	19	3	180	4-Ø19	12.27
NRF11-0300PN (923431)	DN80	3"	PN10 PN16	180	331	200	160	132	19	3	200	8-Ø19	16.31
NRF11-0400PN (923430)	DN100	4"	PN10 PN16	190	366	220	180	156	19	3	254	8-Ø19	21.12
NRF11-0500PN (923429)	DN125	5"	PN10 PN16	200	447	250	210	184	19	3	280	8-Ø19	32.60
NRF11-0600 (923428)	DN150	6"	PN10 PN16	210	490	285	240	211	19	3	305	8-Ø23	42.21
NRF11-0800PN10 (923427)	DN200	8"	PN10	230	560	340	295	266	20	3	350	8-Ø23	57.28
NRF11-0800PN16 (923426)			PN16									12-Ø23	
NRF11-1000PN10 (923425)	DN250	10"	PN10	250	706	405	350	319	22	3	450	12-Ø23	105.62
NRF11-1000PN16 (923424)			PN16				355					12-Ø28	
NRF11-1200PN10 (923423)	DN300	12"	PN10	270	802	460	400	370	24.5	4	450	12-Ø23	169.02
NRF11-1200PN16 (923422)			PN16				410					12-Ø28	

Non-Rising Stem (NRS) EN1171 Gate Valve - Flanged - NRF11

Materials List

Item	Description	Material	Specification	Item	Description	Material	Specification
1	Valve Body	Ductile Iron	EN-GJS-450-10	13	Flat Washer	Carbon Steel	Zinc Plated
2	Resilient wedge disc	Ductile Iron	EN-GJS-450-10 & EPDM	14	Bolt	Stainless Steel	SS304
3	Stem	Stainless Steel	2Cr13	15	Fixed Plate	Stainless Steel	SS316
4	Bolt	Carbon Steel	Zinc Plated	16	Ring Wiper	EPDM	Commercial
5	Bonnet	Ductile Iron	EN-GJS-450-10	17	Bolt	Carbon Steel	Zinc Plated
6	O-Ring	NBR	Commercial	18	Flat Washer	Carbon Steel	Zinc Plated
7	Gland	Ductile Iron	EN-GJS-450-10	19	O-Ring	EPDM	Commercial
8	Position Fixing Spindle	Stainless Steel	SS316	20	Thrust Washer	Brass	HPb59-1
9	Limit Plate	Stainless Steel	SS316 See 23	21	Bonnet Gasket	EPDM	Commercial
10	Position Fixing Plate	Stainless Steel	SS316	22	Wedge Nut	Brass	C95400
11	Handwheel	Ductile Iron	EN-GJS-450-10	23	Switch bracket for NRF11 Valve - Part Number: NRF-SB		
12	Bolt	Carbon Steel	Zinc Plated				

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03-04-2018 Datasheet updates the datasheet of 24-04-2017 (Change description of item 21 in materials list)

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FIREKING

VIKING

Control Valves

Non-Rising Stem (NRS) EN1171 Gate Valve - Flanged

NRF11

Installation

1. Piping systems and valves should be thoroughly cleaned and free from ingress of foreign materials.
2. Visually inspect the valve seating and ports for cleanliness immediately prior to installation.
3. All valves should be independently supported against movement and stress from the connected piping system.
4. Ensure that the valve pressure rating is compatible with service conditions.
5. Operate the valve at least once from the open to closed position.
6. Verify that packing nuts are tight before pressurizing the system.
7. Gate valves are not suitable for throttling applications.
8. Gate valves should be installed in the vertical position on horizontal pipework and in the horizontal position on vertical pipework.

Operation

Gate valves are manually operated multi-turn valves and are opened by a handwheel or other operating device, generally in a counter clockwise direction and then closed clockwise.

Closing Torque for Gate Valve Handwheel		
Size		Closing Torque Nm
2"	DN50	27
2½"	DN65	38
3"	DN80	65
4"	DN100	80
5"	DN125	100
6"	DN150	125
8"	DN200	160
10	DN250	240
12"	DN300	300

Inspection and Maintenance

1. Valves should be inspected periodically and should be cycled to prevent buildup of foreign materials in the piping system and valve body.
2. Always shut down the system before repacking the valve. Valves are designed with backseats for repacking under pressure but this is not recommended.

03-04-2018 Datasheet updates the datasheet of 24-04-2017 (Change description of item 2 in materials list)

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MINIMAX

Technisches Datenblatt
technical data sheet

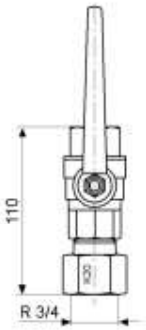
M2-10-03 Teil 2
part 2

Ergänzung / *amendment: 11.05*

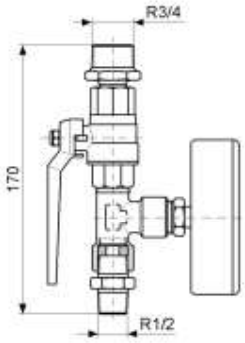
Prüfgeräte für Strömungsmelder — *test devices for waterflow detector*

Maße in **mm**; Gewicht **in kg/St.** — *dimensions in **mm**; weight in **kg/pc***

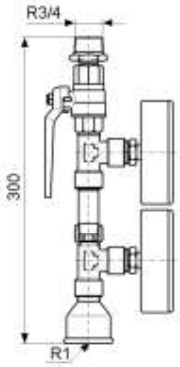
K20 **mit / ohne** festen Anschluss
*K20 **with / without** fastened connection*



K30 **ohne** festen Anschluss
*K30 **without** fastened connection*



K30 **mit** festem Anschluss
*K30 **with** fastened connection*



Prüfgerät Strömungsmelder *testing device waterflow detector*	Art.-Nr. *order no.*	Gewicht *weight*
K20 **mit / ohne** festen Anschluss *K20 **with / without** fastened connection*	88 0123 (LG)	0,5
K30 **ohne** festen Anschluss *K30 **without** fastened connection*	78 5605 (LG)	1,1
K30 **mit** festem Anschluss *K30 **with** fastened connection*	77 3386 (LG)	2,0

(LG) = lagerhaltig — *(LG) = available from stock*

Instandhaltung: ..... Sichtkontrolle
Produktinformation: ..... -/-
Ersatzteile: ..... -/-

maintenance: ..... *visual check*
product information: ..... *-/-*
spare parts: ..... *-/-*

mitgeltende Blätter:
Manometer 16 bar - ER 2MAZ M1-12-01
Kugelhahn 3/4 - PN40 ..... M2-04-15

sheets also applying:
pressure gauge 16 bar - ER 2 pointers M1-12-01
ball valve 3/4 - PN40 ..... M2-04-15

Anwendung Prüfgerät Strömungsmelder

K20 **mit / ohne** festen Anschluss:
- Nassanlagen mit einem Mindestbetriebsdruck von 8,2 bar (am Prüfgerät);
- zum festen Anschluss an das Abwassernetz oder für freien Auslauf.

K30 **ohne** festen Anschluss:
- Nassanlagen mit einem Mindestbetriebsdruck von 3,6 bar (am Prüfgerät);
- für freien Auslauf.

K30 **mit** festem Anschluss:
- Nassanlagen mit einem Differenzdruck von 3,6 bar (am Prüfgerät);
- zum festen Anschluss an das Abwassernetz.

application testing device waterflow detector

*K20 **with / without** fastened connection:*
- *wet pipe systems with a minimum pressure of 8,2 bar (at the point of the test device);*
- *for use in a piping with a fixed connection with the sewage system or for open discharge.*

*K30 **without** fastened connection:*
- *wet pipe systems with a minimum pressure of 3,6 bar (at the point of the test device);*
- *for open discharge.*

*K30 **with** fastened connection:*
- *wet pipe systems with a pressure difference of 3,6 bar (at the point of the test device);*
- *for use in a piping with a fixed connection with the sewage system.*

Erstellt: | Dieses Dokument unterliegt im ausgedruckten Zustand nicht dem Änderungsdienst. *This printed document is not part of the change service.* | Freigabe:

Seite / *page* 1/1

1.5 SPISAK KORIŠĆENIH PROPISA I LITERATURE

1. Zakon o planiranju prostora i izgradnji objekata (Sl.list CG br.064/17, 044/18, 063/18)
2. Pravilnik o načinu izrade i sadržini tehničke dokumentacije za građenje objekata (Sl.list CG br. 044/18)
3. Zakon o zaštiti i zdravlju na radu (Sl.list CG br. 34/14, 044/18)
4. Pravilnik o opštim mjerama zaštite na radu za građevinske objekte namijenjene za radne i pomoćne prostorije, Sl.glasnik SRS br. 29/87
5. Zakon o zaštiti i spašavanju (Sl.list CG br. 13/07, 5/08, 32/11, 054/16)
6. MEST EN 12845:2016

2. NUMERIČKA DOKUMENTACIJA

2.1 PRORAČUNI

1. POTREBNA KOLIČINA VODE ZA SPRINKLER SISTEM

Proračun potrebne količine vode za sprinkler sistem urađen je prema MEST EN 12845:2016 standardu. Parametri stabilnog sistema za gašenje požara određeni su prema pregledu Tabele 3.

Prilog Annex A, tabela A.2, prikazuje osnovne grupe proizvoda (proizvodnih i tehnoloških procesa) prema stepenu opasnosti razvitka požara u zavisnosti od njegove funkcionalne namjene i požarnog opterećenja sagorivog materijala. Objekat, odnosno štićeni prostori po svojoj namjeni i karakteru su svrstani u grupe prostorija sa požarnim opterećenjem OH1 (fiskulturna sala kao lokacija proračuna, usljed velike visine).

Iz pregleda Tabele 3 za požarnu opasnost OH1 dobijeni su sledeći parametri stabilnog sistema za gašenje požara vodom:

- Minimalna brzina dotoka vode: 5 l/min m^2
- Dejstvujuća površina za suvi sistem: 90 m^2
- Minimalno pogonsko vrijeme: 60 min
- Maksimalna štićena površina po sprinkler mlaznici: 12 m^2
- Maksimalno rastojanje između sprinkler mlaznica: 4 m

Na osnovu gornjih podataka proračunom se dobija minimalna (teorijska) potrošnja vode za sistem sa sprinkler mlaznicama:

$$\mathbf{Q_{SOH}} = 5 \times 90 = 450 \text{ l/min}$$

Zbog nejednolikosti mreže za potrošnju vode, uzima se 40% više od minimalne (teorijske) potrošnje vode:

$$\mathbf{Q'_{SOH}} = 450 \times 1{,}4 = 630 \text{ l/min}$$

Tačna količina vode neophodna za gašenje požara, dobijena je hidrauličkim proračunom, čiji je izvještaj dat u nastavku.

EN 12845:2015 (E)

Table 3 — Design criteria for LH, OH and HHP

Hazard Class	Design Density mm/min	Area of Operation m^2	
		Wet or pre-action	Dry or alternate
LH	2,25	84	Not allowed Use OH1
OH1	5,0	72	90
OH2	5,0	144	180
OH3	5,0	216	270
OH4	5,0	360	Not allowed Use HHP1
HHP1	7,5	260	325
HHP2	10,0	260	325
HHP3	12,5	260	325
HHP4	deluge (see NOTE)		
NOTE Needs special consideration. Deluge systems are not covered by this standard.			

Annex A
(normative)

Classification of typical hazards

Tables A1, A.2 and A.3 contain lists of minimum hazard classification. They shall also be used as guidance for occupancies not specifically mentioned. They shall be read in conjunction with 6.2.

Table A.1 — Light Hazard occupancies

Schools and other educational institutions (certain areas) *see* 6.2.2
Offices (certain areas) *see 6.2.2*
Prisons

Table A.2 — Ordinary Hazard occupancies

Occupancy	Ordinary hazard group			
	OH1	OH2	OH3	OH4
Glass and ceramics			Glass factories	
Chemicals	Cement works	Photographic film factories	Dyers works soap factories Photographic laboratories Paint application shops with water based paint	
Engineering	Sheet metal product factories	Metal working	Electronics factories Radio equipment factories Washing machine factories Car workshops	
Food and beverages		Abattoirs, meat factories Bakeries Biscuit factories Breweries Chocolate factories Confectionery *Dairies* Factories	Animal fodder factories Corn mills Dehydrated vegetable and soup factories Sugar factories	Alcohol distilleries
Miscellaneous	Hospitals Hotels Libraries (excluding book stores) Restaurants Schools (see	Laboratories (physical) Laundries Car parks Museums	Broadcasting studios (small) Railway stations Plant (technical) room Farm building	Cinemas and theatres Concert halls tobacco factories Film and TV Production Studio

Occupancy	Ordinary hazard group			
	OH1	OH2	OH3	OH4
	6.2.2) Offices (see 6.2.2)			
Paper			Book binding factories cardboard factories paper factories	Waste paper processing
Shops and offices	Data processing (computer room, excluding tape storage) Offices see 6.2.2		Department stores shopping centre	Exhibition halls[a]
Textiles and clothing		Leather goods factories	Carpet factories (excluding rubber and foam plastics) Cloth and clothing factories fibre board factories Footwear factories (excluding plastics and rubber) Knitting factories linen factories Mattress factories (excluding foam plastics) Sewing factories weaving mills Woolen and worsted mills	Cotton mills Flax preparation plants Hemp preparation plants
Timber and wood			Woodworking factories Furniture factories (without foam plastics) Furniture showrooms Upholstery (without foam plastics) factories	Saw mills Plywood factories

NOTE Where there is painting or other similar high fire load areas in a OH1 or OH2 occupancy, they should be treated as OH3.

[a] Excessive clearance shall be taken into consideration.

2. DIMENZIONISANJA CIJEVNIH INSTALACIJA

Dimenzionisanje cijevnih vodova je urađeno u skladu sa EN 12845 propisima, koji propisuje da brzina vode u cjevovodima ne smije biti veća od 10 m/s.
Pored zahtjeva za brzinu proticanja, ispoštovan je i zahtjev da radni pritisak vode na sprinkler mlaznici ne smije biti manji od 0,35 bar.

3. IZBOR SPRINKLER MLAZNICA

Izbor sprinkler mlaznica urađen je po MEST EN 12845 propisima. Proračunska potrošnja vode po sprinkler mlaznici (**Q_S**):

$$Q_s = k \times \sqrt{H} \quad (\text{l/s})$$

gde je:
k – koeficijent isticanja mlaznice
N – pritisak ispred mlaznice, (m)

U zavisnosti od raspoloživog pritiska ispred mlaznice, kao i od proračunske potrošnje vode na osnovu inteziteta kvašenja:

$$Q_M=5x12=60 \text{ l/min} =1 \text{ l/s}$$

$$60=k \text{ x } \sqrt{0.5} \Rightarrow k=\frac{60}{\sqrt{0.5}}=84.85 \Rightarrow k=80$$

Prilikom izbora sprinklera treba uzeti u obzir geometrijske dimenzije prostorije kao i druge građevinske uslove, zatim postojeći pritisak u mreži cjevovoda i potrebnu količinu vode.

Izabrana su mlaznice:
Sprinkler standard viseća mlaznica: K=80, P=12 m^2, T=68°C, R1/2 (DN15), 5 mm ampula (hodnici, kancelarije i opšte prostorije)

Za dio FISKULTURNA SALA se biraju mlaznice sa k faktorom 115, obzirom na visinu tog dijela objekta:
Sprinkler standardna stojeća mlaznica: K=115, P=12 m^2, T=68°C, R1/2 (DN15), 5 mm ampula

4. PAD PRITISKA U INSTALACIJI

$\Delta P=\Delta P_1+\Delta P_2+H$

ΔP – ukupan pad pritiska (bar)
ΔP_1 – pad pritiska zbog otpora u cijevima (bar)
ΔP_2 – pad pritiska zbog otpora u armaturi (bar)
H – geodetska visina (bar)

$\Delta P_1+\Delta P_2$ po HAZEN – WILLIAMS – u:

$\Delta P_{12}= \Delta P_1+\Delta P_2= 6.05 \times 10^5 \times C^{-1.85} \times d^{4.87} \times Q^{1.85} \times L$ (bar)
C – konstanta za cijevi (za čelične cijevi C=120), pa je:
$\Delta P_{12} = \Delta P_1+\Delta P_2 = K \times Q^{1.85} \times L$ (bar)

Q – protok vode (l/min)
L – stvarna + ekvivalentna dužina (m)

5. HIDRAULIČKI PRORAČUN

Hidraulički proračun je dobijen programom EliteSoft “Fire”. Princip rada programa je potpuno u skladu sa propisima. Rezultati programa su dati tabelarno. Proračunska zona pokrivanja je dio mreže u fiskulturnoj sali kao hidraulički najzahtjevniji..

FISKULTURNA SALA:

Stvarna potrošnja vode je:
Q = 1626 l/min
Pad pritiska u instalaciji je: Δp_1 = 4.07 bar
Rezervni pritisak je: Δp_2 = 0.5 bar
Potreban pritisak: p = 4.07 + 0.5 = 4.57 bar

Obzirom na garancije ovlašćenog preduzeća o garantovanom pritisku na mjestu priključka objekta (12 bara), nije potrebno predvidjeti pumpno postrojenje za povećanje pritiska. Međutim, potrebno je ugraditi reducir pritiska, jer je pritisak iz mreže prevelik da bi se bez smanjenja na tražene parametre direktno puštao u sprinkler mrežu.

ВОДОВОД АНДРИЈЕВИЦА
д.о.о. „ВОДОВОД И КАНАЛИЗАЦИЈА“ - АНДРИЈЕВИЦА

Crna Gora
D.O.O. "VODOVOD I KANALIZACIJA"
Broj: 430
Andrijevica, 24. 08. 2023 god.

TEHNIČKI USLOVI

Za izradu tehničke dokumentacije

Na vaš zahtjev br.435 od 24.08.2023.godine.

Investitor: **DOO “Urbi Pro”,Podgorica**

-Za objekat:- **na katasterskoj parceli br.699/1 KO Andrijevica,upravljanje 1/1 JU Osnovna Škola Bajo Jojić**

-mjesto: **Andrijevica**

-planski dokument

Tehnički uslovi za izradu tehničke dokumentacije za:

a) **Vodovod**: Napajanje vodom se vrši preko zajedničke mreže i zajedničkog mjernog uređaja(vodomjera) Srednje i Osnovne škole i već postoji dovod vode promjera 2 cola,(Ø63).Dimenzije šahte su 1m x 1.20m x 0.90m.Pritisak na mjernom mjestu je oko 12 bari.Sa lijeve strane šahte na udaljenosti od 7 metara nalazi se glavna cijev Ø110 sa koje je takođe moguće izvršiti priključenje prema fiskulturnoj sali.

b) **Kanalizacija**: Na tom dijelu ne postoji kanalizaciona mreža,već je odvođenje fekalne mreže riješeno septičkom jamom čija je zapremina nepoznata,samim tim nije u našoj nadležnosti.

Napomena:Kako se radi o rekonstrukciji moguće je iskoristiti već postojeće priključke.

U prilogu je skica sa oznakama-izvor google earth.

VD IZVRŠNOG DIREKTORA

MILOŠ MIJOVIĆ

Adresa: Branka Deletića bb
Internet adresa: vodan.me
Pib-matični broj: 03017940

Šifra djelatnosti: 3600
PDV broj: 63/31-00120-8
Žiro račun: 535 - 14866 - 04

Izvršni direktor: +38269755250
Korisnički servis: 051/244-345
e-mail: 1vodovodikanalizacija@gmail.com

Odgovorni inženjer
Vuk Kasalica, dipl. ing. maš.

6. IZVJEŠTAJ HIDRAULIČKOG PRORAČUNA

FISKULTURNA SALA ANDRIJEVICA
Fire Sprinkler Reports

for

Prepared By:

9/7/2023

General Project Data Report

General Data

Project Title:	FISKULTURNA SALA ANDRIJEVICA	Project File Name:	FISK SALA ANDRIJEVICA..fiw
Designed By:		Date:	9/7/2023
Code Reference:		Approving Agency:	
Client Name:		Phone:	
Address:		City, State Zip Code:	
Company Name:		Representative:	
Company Address:		City And State:	
Phone:			
Building Name:		Building Owner:	
Contact at Building:		Phone at Building:	
Address Of Building:		City, State Zip Code:	

Project Data

Description Of Hazard:	OH1		Sprinkler System Type:	Wet	
Design Area Of Water Application:	72	m²	Maximum Area Per Sprinkler:	0	m²
Default Sprinkler K-Factor:	65.30	Km	Default Pipe Material:	SCHED 40 WET STEEL	
Inside Hose Stream Allowance:	0.00	Lpm	Outside Hose Stream Allowance:	0.00	Lpm
In Rack Sprinkler Allowance:	0.00	Lpm			

Sprinkler Specifications

Make:	VIKING		Model:	MX-3	
Size:	DN15		Temperature Rating:	67.79	C

Water Supply Test Data

Source Of Information:					
Test Hydrant ID:			Date Of Test:		
Hydrant Elevation:	0	m	Static Pressure:	0.00	kPa
Test Flow Rate:	0.00	Lpm	Test Residual Pressure:	0.00	kPa
Calculated System Flow Rate:	1625.78	Lpm	Calculated Inflow Residual Pressure:	406.83	kPa

Calculation Project Data

Calculation Mode:	Demand				
HMD Minimum Residual Pressure:	56.00	kPa	Minimum Desired Flow Density:	5.00	Lpm/m²
Number Of Active Nodes:	40				
Number Of Active Pipes:	39		Number Of Inactive Pipes:	0	
Number Of Active Sprinklers:	15		Number Of Inactive Sprinklers:	0	

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Fire Sprinkler Input Data

Node Input Data

Node No.	Node Description Branch Description	Area Group Branch Dia. (cm)	Sprinkler KFactor (Km) Branch Len. (m)	Pressure Estimate (kPa) Branch Stnd Fittings	Node Elev (m) Branch Non-Stnd Fittings (m)	Non-Sprinkler Flow (Lpm) Branch Sprk KFactor (Km)
1	Sprinkler ----	---- 0.000	115.00 0.0	56.00 ----	9.80 0.0	0.00 0.00
2	Sprinkler ----	---- 0.000	115.00 0.0	65.46 ----	9.80 0.0	0.00 0.00
3	Sprinkler ----	---- 0.000	115.00 0.0	73.06 ----	9.80 0.0	0.00 0.00
4	Sprinkler ----	---- 0.000	115.00 0.0	80.15 ----	9.80 0.0	0.00 0.00
5	Sprinkler ----	---- 0.000	115.00 0.0	81.30 ----	9.80 0.0	0.00 0.00
6	Sprinkler ----	---- 0.000	115.00 0.0	72.61 ----	8.70 0.0	0.00 0.00
7	Sprinkler ----	---- 0.000	115.00 0.0	83.26 ----	8.70 0.0	0.00 0.00
8	Sprinkler ----	---- 0.000	115.00 0.0	91.82 ----	8.70 0.0	0.00 0.00
9	Sprinkler ----	---- 0.000	115.00 0.0	99.79 ----	8.70 0.0	0.00 0.00
10	Sprinkler ----	---- 0.000	115.00 0.0	101.08 ----	8.70 0.0	0.00 0.00
11	Sprinkler ----	---- 0.000	115.00 0.0	89.27 ----	8.00 0.0	0.00 0.00
12	Sprinkler ----	---- 0.000	115.00 0.0	101.46 ----	8.00 0.0	0.00 0.00
13	Sprinkler ----	---- 0.000	115.00 0.0	111.23 ----	8.00 0.0	0.00 0.00
14	Sprinkler ----	---- 0.000	115.00 0.0	120.33 ----	8.00 0.0	0.00 0.00
15	Sprinkler ----	---- 0.000	115.00 0.0	121.81 ----	8.00 0.0	0.00 0.00
16	No Discharge ----	---- 0.000	N/A 0.0	147.43 ----	7.20 0.0	0.00 0.00

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Fire Sprinkler Input Data

Node Input Data (cont'd)

Node No.	Node Description Branch Description	Area Group Branch Dia. (cm)	Sprinkler KFactor (Km) Branch Len. (m)	Pressure Estimate (kPa) Branch Stnd Fittings	Node Elev (m) Branch Non-Stnd Fittings (m)	Non-Sprinkler Flow (Lpm) Branch Sprk KFactor (Km)
17	No Discharge ----	---- 0.000	N/A 0.0	145.76 ----	7.20 0.0	0.00 0.00
18	No Discharge ----	---- 0.000	N/A 0.0	135.42 ----	7.20 0.0	0.00 0.00
19	No Discharge ----	---- 0.000	N/A 0.0	124.31 ----	7.20 0.0	0.00 0.00
20	No Discharge ----	---- 0.000	N/A 0.0	110.45 ----	7.20 0.0	0.00 0.00
21	No Discharge ----	---- 0.000	N/A 0.0	135.25 ----	7.20 0.0	0.00 0.00
22	No Discharge ----	---- 0.000	N/A 0.0	133.73 ----	7.20 0.0	0.00 0.00
23	No Discharge ----	---- 0.000	N/A 0.0	124.33 ----	7.20 0.0	0.00 0.00
24	No Discharge ----	---- 0.000	N/A 0.0	114.23 ----	7.20 0.0	0.00 0.00
25	No Discharge ----	---- 0.000	N/A 0.0	101.64 ----	7.20 0.0	0.00 0.00
26	No Discharge ----	---- 0.000	N/A 0.0	122.09 ----	7.20 0.0	0.00 0.00
27	No Discharge ----	---- 0.000	N/A 0.0	120.74 ----	7.20 0.0	0.00 0.00
28	No Discharge ----	---- 0.000	N/A 0.0	112.40 ----	7.20 0.0	0.00 0.00
29	No Discharge ----	---- 0.000	N/A 0.0	103.46 ----	7.20 0.0	0.00 0.00
30	No Discharge ----	---- 0.000	N/A 0.0	92.32 ----	7.20 0.0	0.00 0.00
31	No Discharge ----	---- 0.000	N/A 0.0	153.09 ----	7.20 0.0	0.00 0.00
32	No Discharge ----	---- 0.000	N/A 0.0	166.97 ----	7.20 0.0	0.00 0.00
33	No Discharge ----	---- 0.000	N/A 0.0	179.87 ----	7.20 0.0	0.00 0.00

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Node Input Data (cont'd)

Node No.	Node Description Branch Description	Area Group Branch Dia. (cm)	Sprinkler KFactor (Km) Branch Len. (m)	Pressure Estimate (kPa) Branch Stnd Fittings	Node Elev (m) Branch Non-Stnd Fittings (m)	Non-Sprinkler Flow (Lpm) Branch Sprk KFactor (Km)
34	No Discharge ----	---- 0.000	N/A 0.0	181.96 ----	7.20 0.0	0.00 0.00
35	No Discharge ----	---- 0.000	N/A 0.0	186.43 ----	7.20 0.0	0.00 0.00
36	No Discharge ----	---- 0.000	N/A 0.0	263.90 ----	7.20 0.0	0.00 0.00
37	No Discharge ----	---- 0.000	N/A 0.0	317.23 ----	2.70 0.0	0.00 0.00
38	No Discharge ----	---- 0.000	N/A 0.0	334.05 ----	2.70 0.0	0.00 0.00
39	No Discharge ----	---- 0.000	N/A 0.0	375.65 ----	0.00 0.0	0.00 0.00
40	No Discharge ----	---- 0.000	N/A 0.0	406.83 ----	0.00 0.0	0.00 0.00

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Fire Sprinkler Input Data

Pipe Input Data

Beg. Node	End. Node	Pipe Description	Nominal Diameter (mm)	Type Group	Fitting Data	Nominal Length (m)	Fitting Length (m)	Total Length (m)	CFactor (gpm/inch-psi)
40	39	SCHED 40 WET STEEL	101.600	0	TGC	2.00	23.41	25.41	120
39	38	SCHED 40 WET STEEL	101.600	0	EG	2.70	9.66	12.36	120
38	37	SCHED 40 WET STEEL	101.600	0	TG	7.00	6.71	13.71	120
37	36	SCHED 40 WET STEEL	101.600	0	E	4.50	3.05	7.55	120
36	35	SCHED 40 WET STEEL	101.600	0	ET	54.00	9.14	63.14	120
35	34	SCHED 40 WET STEEL	101.600	0	E	0.60	3.05	3.65	120
34	33	SCHED 40 WET STEEL	101.600	0		2.65	0.00	2.65	120
33	32	SCHED 40 WET STEEL	63.500	0		2.70	0.00	2.70	120
32	31	SCHED 40 WET STEEL	50.800	0		2.73	0.00	2.73	120
31	20	SCHED 40 WET STEEL	31.750	0	E	3.60	0.91	4.51	120
34	16	SCHED 40 WET STEEL	31.750	0	T	0.85	1.83	2.68	120
16	21	SCHED 40 WET STEEL	31.750	0		2.20	0.00	2.20	120
21	26	SCHED 40 WET STEEL	25.400	0		2.50	0.00	2.50	120
33	17	SCHED 40 WET STEEL	31.750	0	T	0.85	1.83	2.68	120
17	22	SCHED 40 WET STEEL	31.750	0		2.20	0.00	2.20	120
22	27	SCHED 40 WET STEEL	25.400	0		2.50	0.00	2.50	120
32	18	SCHED 40 WET STEEL	31.750	0	T	0.85	1.83	2.68	120
18	23	SCHED 40 WET STEEL	31.750	0		2.20	0.00	2.20	120
23	28	SCHED 40 WET STEEL	25.400	0		2.50	0.00	2.50	120
31	19	SCHED 40 WET STEEL	31.750	0	T	0.85	1.83	2.68	120
19	24	SCHED 40 WET STEEL	31.750	0		2.20	0.00	2.20	120
24	29	SCHED 40 WET STEEL	25.400	0		2.50	0.00	2.50	120
20	25	SCHED 40 WET STEEL	31.750	0		2.20	0.00	2.20	120
25	30	SCHED 40 WET STEEL	25.400	0		2.50	0.00	2.50	120
16	15	SCHED 40 WET STEEL	25.400	0	T	0.80	1.52	2.32	120
17	14	SCHED 40 WET STEEL	25.400	0	T	0.80	1.52	2.32	120

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Fire Sprinkler Input Data

Pipe Input Data (cont'd)

Beg. Node	End. Node	Pipe Description	Nominal Diameter (mm)	Type Group	Fitting Data	Nominal Length (m)	Fitting Length (m)	Total Length (m)	CFactor (gpm/inch-psi)
18	13	SCHED 40 WET STEEL	25.400	0	T	0.80	1.52	2.32	120
19	12	SCHED 40 WET STEEL	25.400	0	T	0.80	1.52	2.32	120
20	11	SCHED 40 WET STEEL	25.400	0	T	0.80	1.52	2.32	120
21	10	SCHED 40 WET STEEL	25.400	0	T	1.50	1.52	3.02	120
22	9	SCHED 40 WET STEEL	25.400	0	T	1.50	1.52	3.02	120
23	8	SCHED 40 WET STEEL	25.400	0	T	1.50	1.52	3.02	120
24	7	SCHED 40 WET STEEL	25.400	0	T	1.50	1.52	3.02	120
25	6	SCHED 40 WET STEEL	25.400	0	T	1.50	1.52	3.02	120
26	5	SCHED 40 WET STEEL	25.400	0	E	2.30	0.61	2.91	120
27	4	SCHED 40 WET STEEL	25.400	0	E	2.30	0.61	2.91	120
28	3	SCHED 40 WET STEEL	25.400	0	E	2.30	0.61	2.91	120
29	2	SCHED 40 WET STEEL	25.400	0	E	2.30	0.61	2.91	120
30	1	SCHED 40 WET STEEL	25.400	0	E	2.30	0.61	2.91	120

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Fire Sprinkler Output Data

Overall Node Groupings Output Data

Pipe Segment Beg. Node	End. Node	Pipe Type Group	Pipe Flow Rate (Lpm)	Sprinkler Flow At Beg. Node (Lpm)	Non-Sprinkler Flow Out (+) (Lpm)	In (-) (Lpm)	Beg. Node Residual Pressure (kPa)	Imbalance Flow At Beg. Node (Lpm)
1	30	0	-86.02	86.02	0.00	0.00	56.00	
2	29	0	-93.00	93.00	0.00	0.00	65.46	0.00319
3	28	0	-98.25	98.25	0.00	0.00	73.06	0.00215
4	27	0	-102.91	102.91	0.00	0.00	80.15	0.00180
5	26	0	-103.64	103.65	0.00	0.00	81.30	0.00169
6	25	0	-97.95	97.95	0.00	0.00	72.61	0.00194
7	24	0	-104.89	104.89	0.00	0.00	83.26	0.00283
8	23	0	-110.14	110.15	0.00	0.00	91.82	0.00311
9	22	0	-114.83	114.83	0.00	0.00	99.79	0.00307
10	21	0	-115.57	115.57	0.00	0.00	101.08	0.00305
11	20	0	-108.61	108.61	0.00	0.00	89.27	0.00337
12	19	0	-115.78	115.78	0.00	0.00	101.46	0.00437
13	18	0	-121.23	121.23	0.00	0.00	111.23	0.00488
14	17	0	-126.09	126.10	0.00	0.00	120.33	0.00534
15	16	0	-126.86	126.87	0.00	0.00	121.81	0.00540
16	15	0	126.86	0.00	0.00	0.00	147.43	-0.00055
16	34	0	-346.08					
16	21	0	219.21					
17	14	0	126.09	0.00	0.00	0.00	145.76	-0.00053
17	33	0	-343.83					
17	22	0	217.74					
18	13	0	121.23	0.00	0.00	0.00	135.42	-0.00029
18	32	0	-329.63					
18	23	0	208.40					
19	12	0	115.78	0.00	0.00	0.00	124.31	-0.00029
19	31	0	-313.67					
19	24	0	197.89					
20	11	0	108.61	0.00	0.00	0.00	110.45	-0.00082
20	31	0	-292.58					
20	25	0	183.97					
21	10	0	115.57	0.00	0.00	0.00	135.25	-0.00136

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Fire Sprinkler Output Data

Overall Node Groupings Output Data (cont'd)

Pipe Segment Beg. Node	End. Node	Pipe Type Group	Pipe Flow Rate (Lpm)	Sprinkler Flow At Beg. Node (Lpm)	Non-Sprinkler Flow Out (+) (Lpm)	In (-) (Lpm)	Beg. Node Residual Pressure (kPa)	Imbalance Flow At Beg. Node (Lpm)
21	16	0	-219.21					
21	26	0	103.64					
22	9	0	114.83	0.00	0.00	0.00	133.73	-0.00139
22	17	0	-217.74					
22	27	0	102.91					
23	8	0	110.14	0.00	0.00	0.00	124.33	-0.00195
23	18	0	-208.40					
23	28	0	98.25					
24	7	0	104.89	0.00	0.00	0.00	114.23	-0.00071
24	19	0	-197.89					
24	29	0	93.00					
25	6	0	97.95	0.00	0.00	0.00	101.64	-0.00134
25	20	0	-183.97					
25	30	0	86.02					
26	5	0	103.64	0.00	0.00	0.00	122.09	-0.00002
26	21	0	-103.64					
27	4	0	102.91	0.00	0.00	0.00	120.74	-0.00024
27	22	0	-102.91					
28	3	0	98.25	0.00	0.00	0.00	112.40	-0.00088
28	23	0	-98.25					
29	2	0	93.00	0.00	0.00	0.00	103.46	-0.00332
29	24	0	-93.00					
30	1	0	86.02	0.00	0.00	0.00	92.32	0.00104
30	25	0	-86.02					
31	19	0	313.67	0.00	0.00	0.00	153.09	-0.00270
31	20	0	292.58					
31	32	0	-606.25					
32	18	0	329.63	0.00	0.00	0.00	166.97	0.00228
32	31	0	606.25					
32	33	0	-935.87					
33	17	0	343.83	0.00	0.00	0.00	179.87	0.00435
33	32	0	935.87					
33	34	0	-1279.71					
34	16	0	346.08	0.00	0.00	0.00	181.96	0.00152
34	33	0	1279.71					
34	35	0	-1625.79					
35	34	0	1625.79	0.00	0.00	0.00	186.43	0.00418
35	36	0	-1625.78					

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Fire Sprinkler Output Data

Overall Node Groupings Output Data (cont'd)

Pipe Segment Beg. Node	Pipe Segment End. Node	Pipe Type Group	Pipe Flow Rate (Lpm)	Sprinkler Flow At Beg. Node (Lpm)	Non-Sprinkler Flow Out (+) (Lpm)	Non-Sprinkler Flow In (-) (Lpm)	Beg. Node Residual Pressure (kPa)	Imbalance Flow At Beg. Node (Lpm)
36	35	0	1625.78	0.00	0.00	0.00	263.90	-0.00319
36	37	0	-1625.78					
37	36	0	1625.78	0.00	0.00	0.00	317.23	0.00084
37	38	0	-1625.78					
38	37	0	1625.78	0.00	0.00	0.00	334.05	-0.00020
38	39	0	-1625.78					
39	38	0	1625.78	0.00	0.00	0.00	375.65	0.00103
39	40	0	-1625.78					
40	39	0	1625.78	0.00	0.00	-1625.78246919595	406.83	

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Fire Sprinkler Output Data

Overall Pipe Output Data

Beg. End. Node	Nodal KFactor (Km)	Elevation (m)	Spk/Hose Discharge (Lpm)	Residual Pressure (kPa)	Nom. Dia. Inside Dia. C-Value	q (Lpm) Q (Lpm) Velocity (m/s)	F. L./m (kPa/m) Fittings Type-Grp	Pipe-Len. Fit-Len. Tot-Len. (m)	PF-(kPa) PE-(kPa) PT-(kPa)
16	0.00	7.20	0.00	147.41	25.40	126.87	7.65356	0.80	17.788
15	114.94	8.00	126.88	121.83	26.670	126.85	T	1.52	7.836
	SCHED 40 WET STEEL				120	3.79	0	2.33	25.623
16	0.00	7.20	0.00	147.41	31.75	0.00	5.53735	2.20	12.182
21	0.00	7.20	0.00	135.28	35.052	219.21	-----	0.00	0.000
	SCHED 40 WET STEEL				120	3.79	0	2.20	12.182
17	0.00	7.20	0.00	145.76	25.40	126.10	7.56781	0.80	17.588
14	114.94	8.00	126.09	120.31	26.670	126.09	T	1.52	7.836
	SCHED 40 WET STEEL				120	3.77	0	2.33	25.424
17	0.00	7.20	0.00	145.76	31.75	0.00	5.46854	2.20	12.031
22	0.00	7.20	0.00	133.76	35.052	217.73	-----	0.00	0.000
	SCHED 40 WET STEEL				120	3.76	0	2.20	12.031
18	0.00	7.20	0.00	135.41	25.40	121.23	7.03672	0.80	16.354
13	114.94	8.00	121.24	111.21	26.670	121.24	T	1.52	7.836
	SCHED 40 WET STEEL				120	3.62	0	2.33	24.190
18	0.00	7.20	0.00	135.41	31.75	0.00	5.04249	2.20	11.094
23	0.00	7.20	0.00	124.31	35.052	208.38	-----	0.00	0.000
	SCHED 40 WET STEEL				120	3.60	0	2.20	11.094
19	0.00	7.20	0.00	124.31	25.40	115.78	6.46269	0.80	15.020
12	114.94	8.00	115.79	101.42	26.670	115.79	T	1.52	7.836
	SCHED 40 WET STEEL				120	3.46	0	2.33	22.856
19	0.00	7.20	0.00	124.31	31.75	0.00	4.58210	2.20	10.081
24	0.00	7.20	0.00	114.25	35.052	197.90	-----	0.00	0.000
	SCHED 40 WET STEEL				120	3.42	0	2.20	10.081
20	0.00	7.20	0.00	110.45	25.40	108.61	5.74142	0.80	13.344
11	114.94	8.00	108.60	89.29	26.670	108.60	T	1.52	7.836
	SCHED 40 WET STEEL				120	3.25	0	2.33	21.179
20	0.00	7.20	0.00	110.45	31.75	0.00	4.00372	2.20	8.808
25	0.00	7.20	0.00	101.63	35.052	183.97	-----	0.00	0.000
	SCHED 40 WET STEEL				120	3.18	0	2.20	8.808
21	0.00	7.20	0.00	135.28	25.40	115.57	6.44079	1.50	19.476
10	114.94	8.70	115.57	101.08	26.670	115.57	T	1.52	14.692
	SCHED 40 WET STEEL				120	3.45	0	3.02	34.169
21	0.00	7.20	0.00	135.28	25.40	0.00	5.26561	2.50	13.164
26	0.00	7.20	0.00	122.11	26.670	103.64	-----	0.00	0.000
	SCHED 40 WET STEEL				120	3.10	0	2.50	13.164

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Fire Sprinkler Output Data

Overall Pipe Output Data (cont'd)

Beg. End. Node	Nodal KFactor (Km)	Elevation (m)	Spk/Hose Discharge (Lpm)	Residual Pressure (kPa)	Nom. Dia. Inside Dia. C-Value	q (Lpm) Q (Lpm) Velocity (m/s)	F. L./m (kPa/m) Fittings Type-Grp	Pipe-Len. Fit-Len. Tot-Len. (m)	PF-(kPa) PE-(kPa) PT-(kPa)
22	0.00	7.20	0.00	133.76	25.40	114.83	6.36458	1.50	19.246
9	114.94	8.70	114.85	99.77	26.670	114.81	T	1.52	14.692
	SCHED 40 WET STEEL				120	3.43	0	3.02	33.938
22	0.00	7.20	0.00	133.76	25.40	0.00	5.19669	2.50	12.992
27	0.00	7.20	0.00	120.73	26.670	102.92	-----	0.00	0.000
	SCHED 40 WET STEEL				120	3.08	0	2.50	12.992
23	0.00	7.20	0.00	124.31	25.40	110.15	5.89272	1.50	17.819
8	114.94	8.70	110.15	91.84	26.670	110.15	T	1.52	14.692
	SCHED 40 WET STEEL				120	3.29	0	3.02	32.511
23	0.00	7.20	0.00	124.31	25.40	0.00	4.76995	2.50	11.925
28	0.00	7.20	0.00	112.38	26.670	98.27	-----	0.00	0.000
	SCHED 40 WET STEEL				120	2.94	0	2.50	11.925
24	0.00	7.20	0.00	114.25	25.40	104.89	5.38293	1.50	16.278
7	114.94	8.70	104.89	83.29	26.670	104.89	T	1.52	14.692
	SCHED 40 WET STEEL				120	3.14	0	3.02	30.970
24	0.00	7.20	0.00	114.25	25.40	0.00	4.30898	2.50	10.772
29	0.00	7.20	0.00	103.49	26.670	93.01	-----	0.00	0.000
	SCHED 40 WET STEEL				120	2.78	0	2.50	10.772
25	0.00	7.20	0.00	101.63	25.40	97.95	4.74273	1.50	14.342
6	114.94	8.70	97.96	72.60	26.670	97.96	T	1.52	14.692
	SCHED 40 WET STEEL				120	2.93	0	3.02	29.034
25	0.00	7.20	0.00	101.63	25.40	0.00	3.72973	2.50	9.324
30	0.00	7.20	0.00	92.32	26.670	86.00	-----	0.00	0.000
	SCHED 40 WET STEEL				120	2.57	0	2.50	9.324
26	0.00	7.20	0.00	122.11	25.40	103.65	5.26561	2.30	15.321
5	114.94	9.80	103.64	81.29	26.670	103.64	E	0.61	25.466
	SCHED 40 WET STEEL				120	3.10	0	2.91	40.787
27	0.00	7.20	0.00	120.73	25.40	102.91	5.19667	2.30	15.120
4	114.94	9.80	102.92	80.12	26.670	102.92	E	0.61	25.466
	SCHED 40 WET STEEL				120	3.08	0	2.91	40.587
28	0.00	7.20	0.00	112.38	25.40	98.25	4.76987	2.30	13.879
3	114.94	9.80	98.27	73.08	26.670	98.27	E	0.61	25.466
	SCHED 40 WET STEEL				120	2.94	0	2.91	39.345
29	0.00	7.20	0.00	103.49	25.40	93.00	4.30870	2.30	12.537
2	114.94	9.80	93.01	65.43	26.670	93.01	E	0.61	25.466
	SCHED 40 WET STEEL				120	2.78	0	2.91	38.003

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Fire Sprinkler Output Data

Overall Pipe Output Data (cont'd)

Beg. End. Node	Nodal KFactor (Km)	Elevation (m)	Spk/Hose Discharge (Lpm)	Residual Pressure (kPa)	Nom. Dia. Inside Dia. C-Value	q (Lpm) Q (Lpm) Velocity (m/s)	F. L./m (kPa/m) Fittings Type-Grp	Pipe-Len. Fit-Len. Tot-Len. (m)	PF-(kPa) PE-(kPa) PT-(kPa)
30	0.00	7.20	0.00	92.32	25.40	86.02	3.72981	2.30	10.852
1	114.94	9.80	86.00	55.99	26.670	86.00	E	0.61	25.466
	SCHED 40 WET STEEL				120	2.57	0	2.91	36.319
31	0.00	7.20	0.00	153.06	31.75	0.00	10.74452	0.85	28.783
19	0.00	7.20	0.00	124.31	35.052	313.65	T	1.83	0.000
	SCHED 40 WET STEEL				120	5.42	0	2.68	28.783
31	0.00	7.20	0.00	153.06	31.75	0.00	9.44617	3.60	42.644
20	0.00	7.20	0.00	110.45	35.052	292.57	E	0.91	0.000
	SCHED 40 WET STEEL				120	5.05	0	4.51	42.644
32	0.00	7.20	0.00	166.99	31.75	0.00	11.77780	0.85	31.551
18	0.00	7.20	0.00	135.41	35.052	329.63	T	1.83	0.000
	SCHED 40 WET STEEL				120	5.69	0	2.68	31.551
32	0.00	7.20	0.00	166.99	50.80	0.00	5.08349	2.73	13.878
31	0.00	7.20	0.00	153.06	52.578	606.26	-----	0.00	0.000
	SCHED 40 WET STEEL				120	4.67	0	2.73	13.878
33	0.00	7.20	0.00	179.88	31.75	0.00	12.73383	0.85	34.112
17	0.00	7.20	0.00	145.76	35.052	343.82	T	1.83	0.000
	SCHED 40 WET STEEL				120	5.94	0	2.68	34.112
33	0.00	7.20	0.00	179.88	63.50	0.00	4.77718	2.70	12.898
32	0.00	7.20	0.00	166.99	62.738	935.89	-----	0.00	0.000
	SCHED 40 WET STEEL				120	5.05	0	2.70	12.898
34	0.00	7.20	0.00	181.95	31.75	0.00	12.88821	0.85	34.526
16	0.00	7.20	0.00	147.41	35.052	346.09	T	1.83	0.000
	SCHED 40 WET STEEL				120	5.98	0	2.68	34.526
34	0.00	7.20	0.00	181.95	101.60	0.00	0.78783	2.65	2.088
33	0.00	7.20	0.00	179.88	102.362	1279.71	-----	0.00	0.000
	SCHED 40 WET STEEL				120	2.60	0	2.65	2.088
35	0.00	7.20	0.00	186.43	101.60	0.00	1.22677	0.60	4.475
34	0.00	7.20	0.00	181.95	102.362	1625.80	E	3.05	0.000
	SCHED 40 WET STEEL				120	3.30	0	3.65	4.475
36	0.00	7.20	0.00	263.86	101.60	0.00	1.22676	54.00	77.462
35	0.00	7.20	0.00	186.43	102.362	1625.76	ET	9.14	0.000
	SCHED 40 WET STEEL				120	3.30	0	63.14	77.462
37	0.00	2.70	0.00	317.23	101.60	0.00	1.22676	4.50	9.260
36	0.00	7.20	0.00	263.86	102.362	1625.80	E	3.05	44.076
	SCHED 40 WET STEEL				120	3.30	0	7.55	53.336

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Fire Sprinkler Output Data

Overall Pipe Output Data (cont'd)

Beg. End. Node	Nodal KFactor (Km)	Elevation (m)	Spk/Hose Discharge (Lpm)	Residual Pressure (kPa)	Nom. Dia. Inside Dia. C-Value	q (Lpm) Q (Lpm) Velocity (m/s)	F. L./m (kPa/m) Fittings Type-Grp	Pipe-Len. Fit-Len. Tot-Len. (m)	PF-(kPa) PE-(kPa) PT-(kPa)
38	0.00	2.70	0.00	334.05	101.60	0.00	1.22676	7.00	16.814
37	0.00	2.70	0.00	317.23	102.362	1625.80	TG	6.71	0.000
	SCHED 40 WET STEEL				120	3.30	0	13.71	16.814
39	0.00	0.00	0.00	375.63	101.60	0.00	1.22676	2.70	15.160
38	0.00	2.70	0.00	334.05	102.362	1625.80	EG	9.66	26.446
	SCHED 40 WET STEEL				120	3.30	0	12.36	41.605
40	0.00	0.00	0.00	406.79	101.60	0.00	1.22676	2.00	31.173
39	0.00	0.00	0.00	375.63	102.362	1625.80	TGC	23.41	0.000
	SCHED 40 WET STEEL				120	3.30	0	25.41	31.173

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Fire Sprinkler Output Data

Overall Sprinkler Output Data

Flowing Sprinkler Node No.	Area Group Code	Sprinkler KFactor (Km)	Sprinkler Elevation (m)	Residual Pressure (kPa)	Flowing Area (m²)	Flowing Density (Lpm/m²)	Sprinkler Discharge (Lpm)
1		115.00	9.80	56.00	0.04	1960.036	86.02
Sub Totals For Non-Group					0.04	1960.036	86.02
2		115.00	9.80	65.46	0.04	2119.059	93.00
Sub Totals For Non-Group					0.04	2119.059	93.00
3		115.00	9.80	73.06	0.04	2238.753	98.25
Sub Totals For Non-Group					0.04	2238.753	98.25
4		115.00	9.80	80.15	0.04	2344.881	102.91
Sub Totals For Non-Group					0.04	2344.881	102.91
5		115.00	9.80	81.30	0.04	2361.641	103.65
Sub Totals For Non-Group					0.04	2361.641	103.65
6		115.00	8.70	72.61	0.04	2231.853	97.95
Sub Totals For Non-Group					0.04	2231.853	97.95
7		115.00	8.70	83.26	0.04	2389.963	104.89
Sub Totals For Non-Group					0.04	2389.963	104.89
8		115.00	8.70	91.82	0.04	2509.757	110.15
Sub Totals For Non-Group					0.04	2509.757	110.15
9		115.00	8.70	99.79	0.04	2616.454	114.83
Sub Totals For Non-Group					0.04	2616.454	114.83
10		115.00	8.70	101.08	0.04	2633.341	115.57
Sub Totals For Non-Group					0.04	2633.341	115.57
11		115.00	8.00	89.27	0.04	2474.727	108.61
Sub Totals For Non-Group					0.04	2474.727	108.61
12		115.00	8.00	101.46	0.04	2638.206	115.78
Sub Totals For Non-Group					0.04	2638.206	115.78
13		115.00	8.00	111.23	0.04	2762.391	121.23
Sub Totals For Non-Group					0.04	2762.391	121.23
14		115.00	8.00	120.33	0.04	2873.198	126.10
Sub Totals For Non-Group					0.04	2873.198	126.10
15		115.00	8.00	121.81	0.04	2890.752	126.87
Sub Totals For Non-Group					0.04	2890.752	126.87
Totals For All Groups					0.66	2469.667	1625.81

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Fire Sprinkler Output Summary

Hydraulically Most Demanding Sprinkler Node

HMD Sprinkler Node Number:	1	
HMD Actual Residual Pressure:	56.00	kPa
HMD Actual Flow:	86.02	Lpm

Sprinkler Summary

Sprinkler System Type:	Wet	
Specified Area Of Application:	72.00	m²
Minimum Desired Density:	4.999	Lpm/m²
Application Average Density:	22.581	Lpm/m²
Application Average Area Per Sprinkler:	4.80	m²
Sprinkler Flow:	1625.81	Lpm
Average Sprinkler Flow:	108.39	Lpm

Flow Velocity And Imbalance Summary

Maximum Flow Velocity (In Pipe 16 - 34)	5.98	m/sec
Maximum Velocity Pressure (In Pipe 16 - 34)	17.85	kPa
Allowable Maximum Nodal Pressure Imbalance:	1.5003	kPa
Actual Maximum Nodal Pressure Imbalance:	0.0073	kPa
Actual Average Nodal Pressure Imbalance:	0.0014	kPa
Actual Maximum Nodal Flow Imbalance:	0.0054	Lpm
Actual Average Nodal Flow Imbalance:	0.0020	Lpm

Overall Network Summary

Number Of Unique Pipe Sections:	39	
Number Of Flowing Sprinklers:	15	
Pipe System Water Volume:	654.66	L
Sprinkler Flow:	1625.81	Lpm
Non-Sprinkler Flow:	0.00	Lpm
Minimum Required Residual Pressure At System Inflow Node:	406.83	kPa
Demand Flow At System Inflow Node:	1625.78	Lpm

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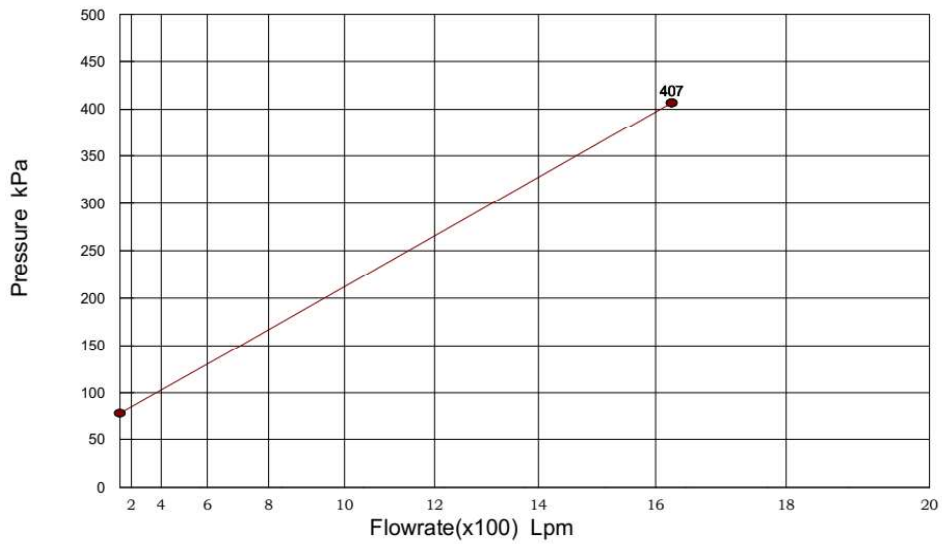
Fire Sprinkler Output Data

Hydraulic Supply/Demand Graph



Demand Curve Data

Calculated Residual Pressure: 406.83 kPa
Calculated Flow Rate: 1625.78 Lpm
Pressure Required For First Sprinkler Downstream From Inflow Node To Flow: 78.36 kPa

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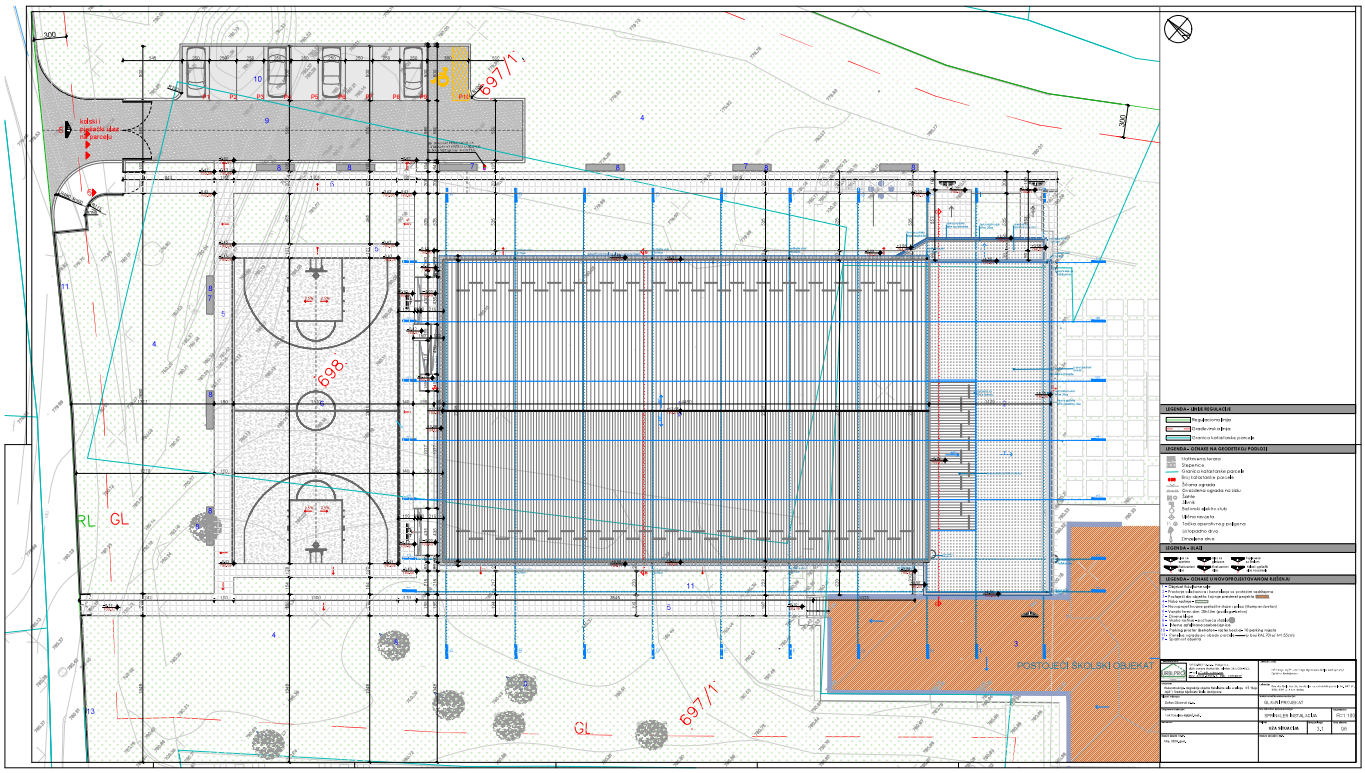
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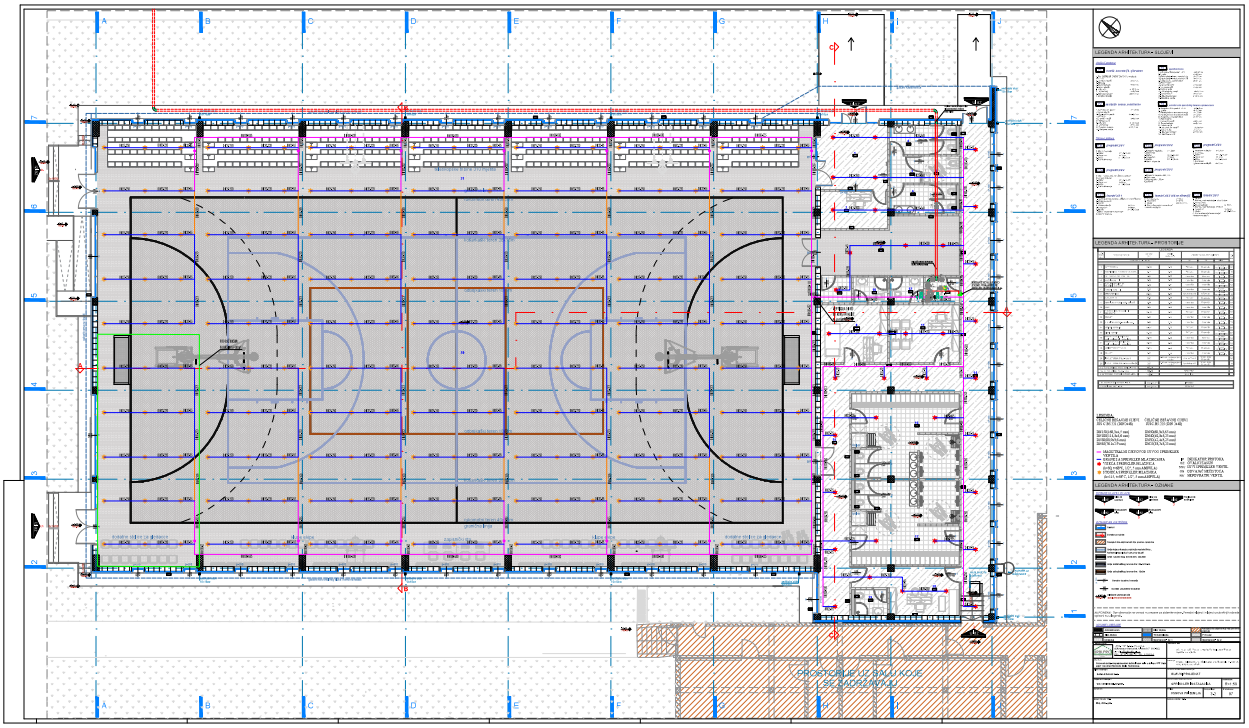
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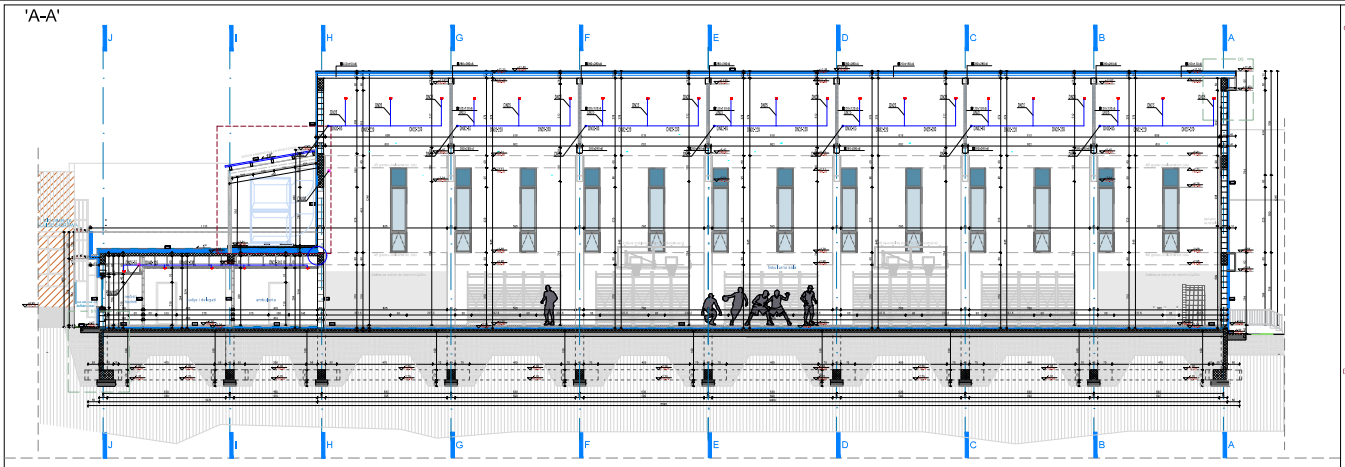

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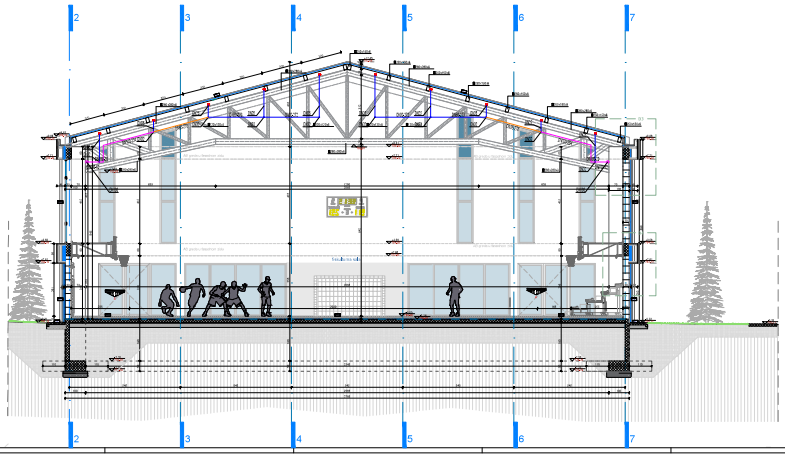
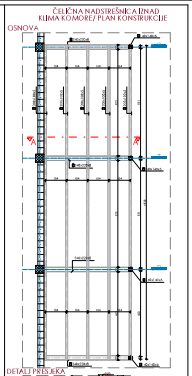
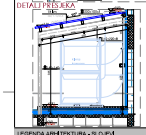


ČELIČNA NADSTREŠNICA NAD KLIMA KOMORE / PLAN KONSTRUKCIJE

OSNOVA



DETALJ PRESJEKA



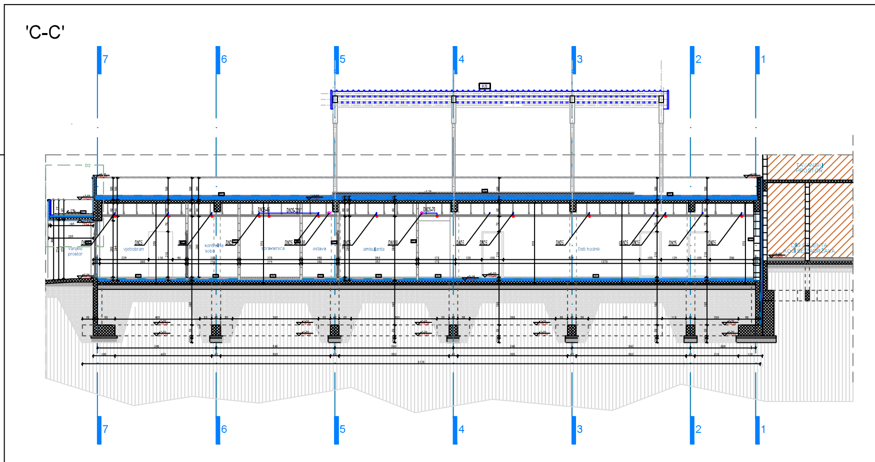
LEGENDA ARHITEKTURA - SLOJEVI

LEGENDA ARHITEKTURA - OZNAKE

NAPOMENA: Tehnološke su prostorijeu na zasjenu za detaljnijeg prikaza. Tehnološ. objekti i ostali sadržaji nisu u ovom prikazu.

GLAVNI PROJEKAT	
NAZIV PROJEKTA:	GRIJANJE I INSTALACIJA
PREGLEDNI NACRT	M 1:100
	A3 / 02

'C-C'



LEGENDA ARHITEKTURA - SLOJEVI

Slojevi krovova

K1 krov iznad borilišta

K2 krov iznad svlačionica i pratećih prostorija

K3 krov iznad svlačionica i pratećih prostorija

K4 krov nadstrešnice

K5 nadstrešnica klima komore

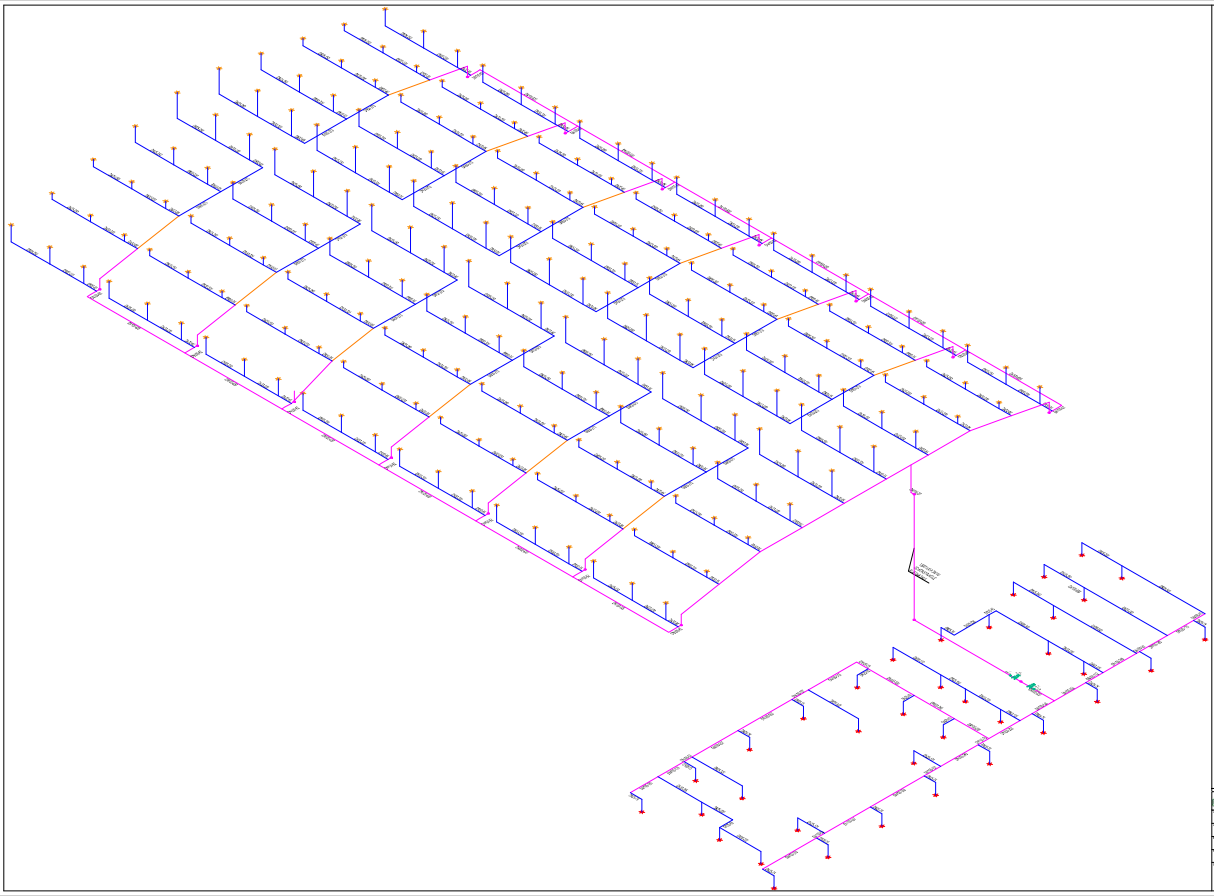
LEGENDA ARHITEKTURA - OZNAKE

ISPUNE / OBRADE

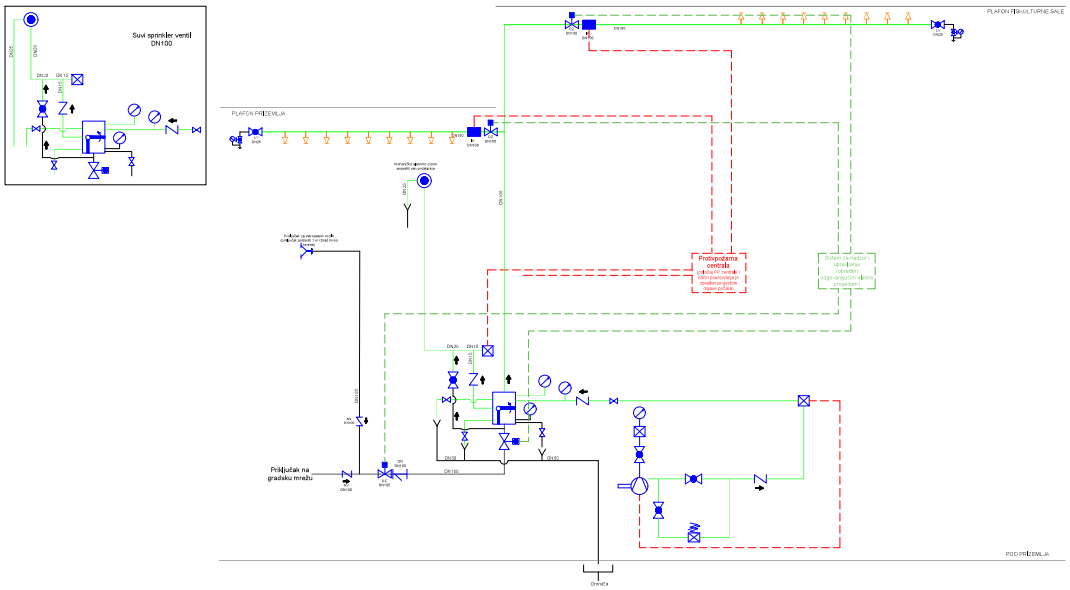
	Armirani beton		Blok 10,0cm		Postojeći dio objekta koji nije predmet projekta
	Blok 30,0cm		Termoizolacija		Nabijeno tlo
	Šljunčani tampon		TR lim		Masna baja

NAPOMENA: Sve dimenzije na presjeku su vezane za zidarske mjere. Fasadni slojevi i slojevi unutrašnjih obrada opisani su u legendi.

Projektant: "URBI.PRO" d.o.o. Podgorica	Investitor: OŠ "Bajo Jojić" i Srednja Mješovita škola Andrijevica / Opština Andrijevica
Objekat: Rekonstrukcija i dogradnja objekta fiskulturne sale u sklopu OŠ "Bajo Jojić" i Srednje Mješovite škole Andrijevica	Lokacija: Branka Deletića bb, Andrijevica
Glavni inženjer: Dušan Đurđević dipl.inž.	Vrsta tehničke dokumentacije: GLAVNI PROJEKAT
Odgovorni inženjer: Vuk Karadžić dipl.inž.maš.	Dio tehničke dokumentacije: SPRINKLER INSTALACIJA — Razmjera: R=1:50
Saradnik:	Prilog: PRESJEK C-C — Broj priloga: 3.4 — Broj strane: 99
Datum izrade i M.P.: Maj, 2024. god.	Datum revizije i M.P.:



Author: Ing. Jan Kubík, Ph.D. Department: Department of Mechanics, Biomechanics and Mechatronics Faculty: Faculty of Mechanical Engineering Institution: CTU in Prague	Subject: CIT Task Solver 1.0 for 3-D Problems in Structural Mechanics
Project: Numerical support for solving full-scale tests on the CIT Test Site - Investigation of a high-rise building	Analysis: Analysis of the impact of the transverse walls on the CIT Test Site - Variant 0
Model: Slab-Column Frame	Load combination: SLAB FREQUENT
Coordinate system: Global Cartesian	Scale: SYMBOLIC DISTRIBUTED LOAD Fz=-50
Comment:	Date: 2022/06/08 Time: 15:15 Page: 1/1
Generated with: FEM Preprocessor	Generated with: FEM



Priključak za vatrogasno vozilo
(usklađen sa ost. opremom u "Elaboratu o izvedbi i ispitivanju sustava za zaštitu od požara")

OH–Odvajač nečistoća

SSV–Suvi sprinkler ventil

Sprinkler stojeća mlaznica

Sprinkler viseća mlaznica

Loptasti ventil

Test ventil sa K faktorom sprinkler mlaznice

OZ–Zasun sa mikroprekidačem (mikroprekidač daje informaciju o položaju ventila "zatvoren/otvoren)

Manometar

NV–Nepovratni ventil

IP–Indikator protoka

Set za testiranje indikatora protoka

Automatski drenažni ventil (operativan K=25, nije operativan K=5)

Mehaničko alarmno zvono

Zasun

Presostat (daje informaciju da je sprinkler sistem proradio)

Posuda za eliminisanje lažnog alarma

Regulator pritiska

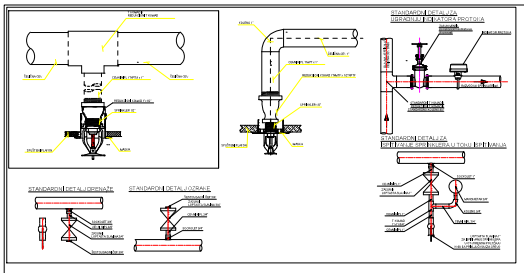
Kompresor

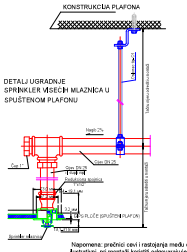
Cjevovod sa vodom

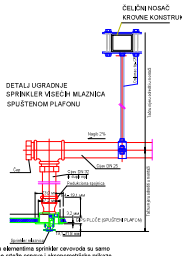
Signalizacija

Cjevovod sa vazduhom

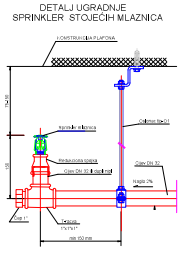
Projektant: INSELPRO d.o.o. Podgorica, Ul.Prof.Radomira Ivanovića 2, Tel/fax: 067/655-633, e-mail: info@inselpro.me, www.inselpro.me, podgorica	Investitor: OŠ "Božo Ćetković" i Gimnazija Mojkovac Ul.Ivo Andrića bb, Opština Mojkovac
Objekat: Rekonstrukcija i dogradnja osnovne škole Božo Ćetković i gimnazije u okviru OŠ "Božo Ćetković" i Gimnazije Mojkovac Ul.Ivo Andrića bb	Lokacija: Mojkovac, k.p. 6464/1 i 6464/2 KO Mojkovac, Opština Mojkovac
Glavni izvođač: Civilan Đ.Đukanović d.o.o.	Naziv tehničke dokumentacije: GLAVNI PROJEKAT
Odgovorni izvođač: Vojislav Đukanović dipl.inž.el.	Br. tehničkog dokumentacije: SPRINKLER INSTALACIJA — Razmjera: R=1:50
Saradnici:	Naziv crteža: TEHNOLOŠKA SHEMA — Broj prilog/faze: 3.6 — Broj crteža: 101
Datum izrade i ver.: Maj, 2024, prv.	Datum revizije i ver.:

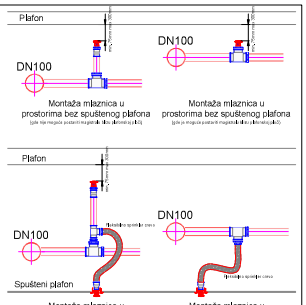




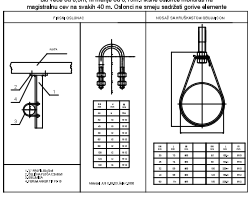


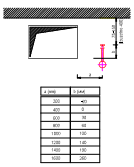
Napomena: pročnici cevi i rastojanja među elementima sprinkler cevovoda su samo ilustrativni, pri montaži koristiti odgovarajuće crtože osnova i aksonometrijska prikaza





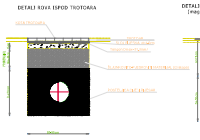
Napomena: Maksimalno rastojanje od oslonca do sprinkler mlaznice ne sme biti veće od 0,8m, ni manje od 0,15m,Fksne oslonce montirati na magistralnu cev na svakih 40 m. Oslonci ne smeju sadržati gorive elemente





RASTOJANJE MLAZNICE OD KONSTRUKCIJE I OPREME KOJA SE NALAZI ISPOD SPRINKLER MLAZNICE

a [mm]	b [mm]
200	40
400	5
600	10
800	15
1000	100
1200	120
1400	130
1600	280



Izradio:	URBIPRO d.o.o., Podgorica, Ul.Bulevar Ivana Crnojevića broj 66, tel/fax: 067/504-022, e-mail: urbipro@t-com.me, PIB: 02011802, MB: 02011802
Naziv projekta:	Rekonstrukcija i dogradnja objekta Kulturno zdravstvenog centra u ulici „Dr Risto Zogić" i Stambeno poslovnog bloka u Podgorici
Investitor:	Kulturno zdravstveni centar d.o.o.
Glavni projektant:	GLAVNI PROJEKAT
Odgovorni projektant:	Vuk Vasiljević dipl.inž.arh.
Broj tehničke dokumentacije:	SPRINKLER INSTALACIJA
Razmjera:	R=1:50
Lokacija:	
Naziv:	DETALJI UGRADNJE MLAZNICE I OSLONACI CJEVOVODA
Broj priloga:	3.7
Broj crteža:	102
Datum izrade i V.Z.:	Mrt. 2024. god.
Datum revizije: V.Z.:	