RIVESTIMENTI IN ANELLI DI CONCI PREFABBRICATI DI GALLERIE REALIZZATE CON TBM

Brescia, 23 Giugno 2022

Aula Magna Ingegneria - Università di Brescia (UniBs)

ORGANIZZATORI

Collegio dei tecnici della Industrializzazione Edilizia

Società Italiana Gallerie
Italian Tunnelling Society

CON IL PATROCINIO DI

Ordine Ingegneri della provincia di Brescia

Università degli Studi di Brescia 1982 | 2022

fib CEB-FIP Fédération Internationale du Béton

MEDIA PARTNER

ingenio informazione tecnica e progettuale

SAIE Bologna, 19/22 ottobre 2022

PRESENTAZIONE

FATTORI CHE INFLUENZANO LA SIGLLATURA DEI CONCI. TOLLERANZE, GUARNIZIONI, INSERTI, CONNETTORI

FAMA
HIGH INTENSITY OF INNOVATION

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FAMA
Fondatore e Ceo
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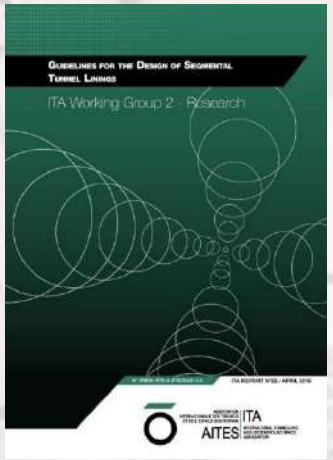
FAMA
HIGH INTENSITY OF INNOVATION

INTRODUZIONE

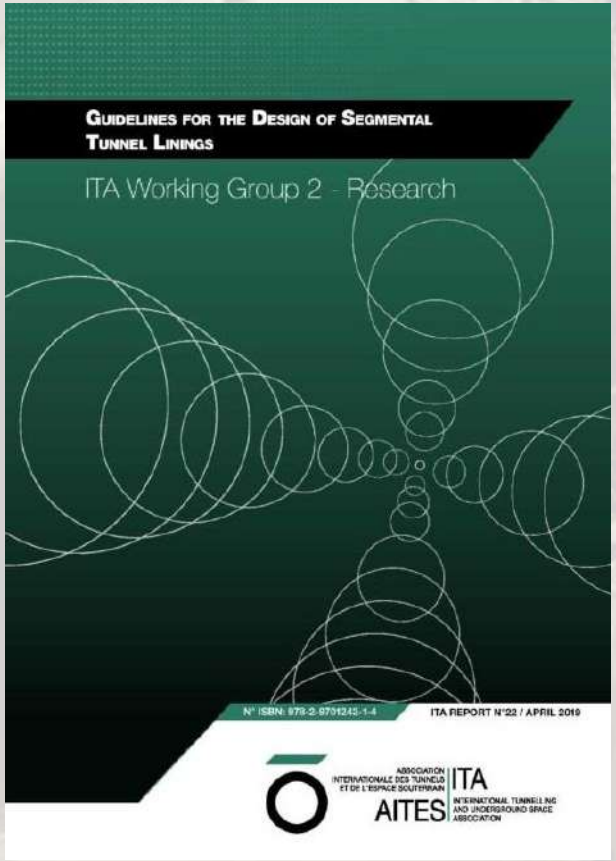
Tenuta stagna della galleria

cap. 10



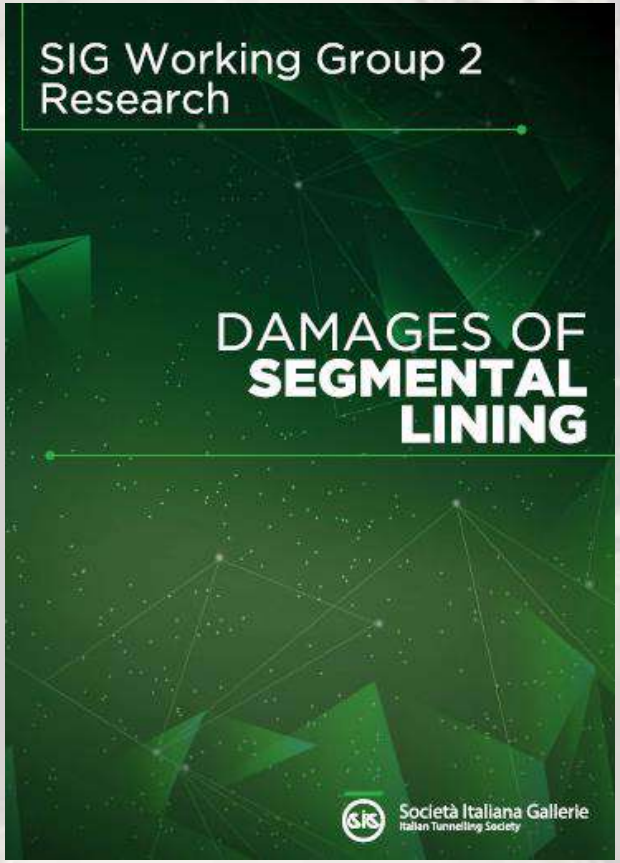
1. FONTI

1.1 ITA WG2 - Guidelines for the Design of Segmental Tunnel Linnings



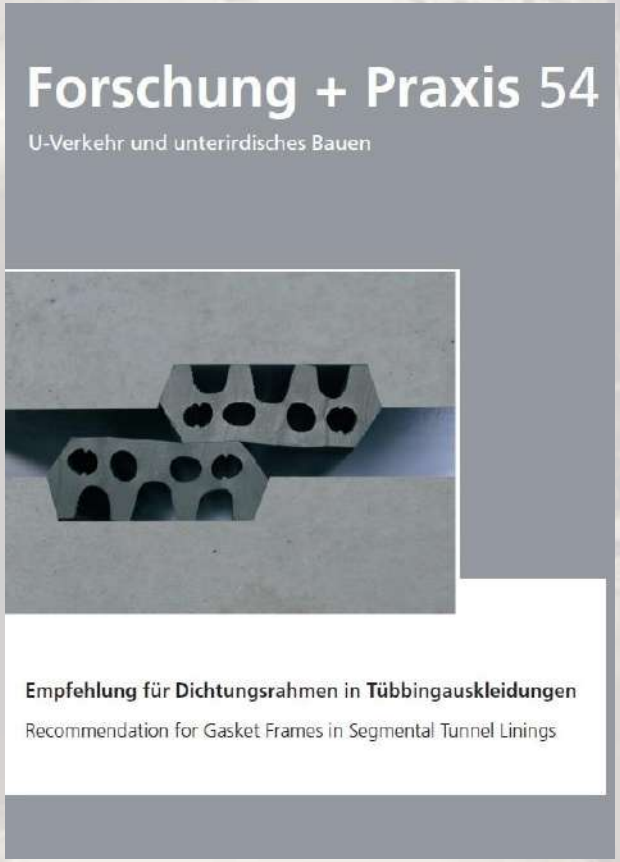
1. FONTI

1.2 SIG WG2 - Damages of Segmental Lining



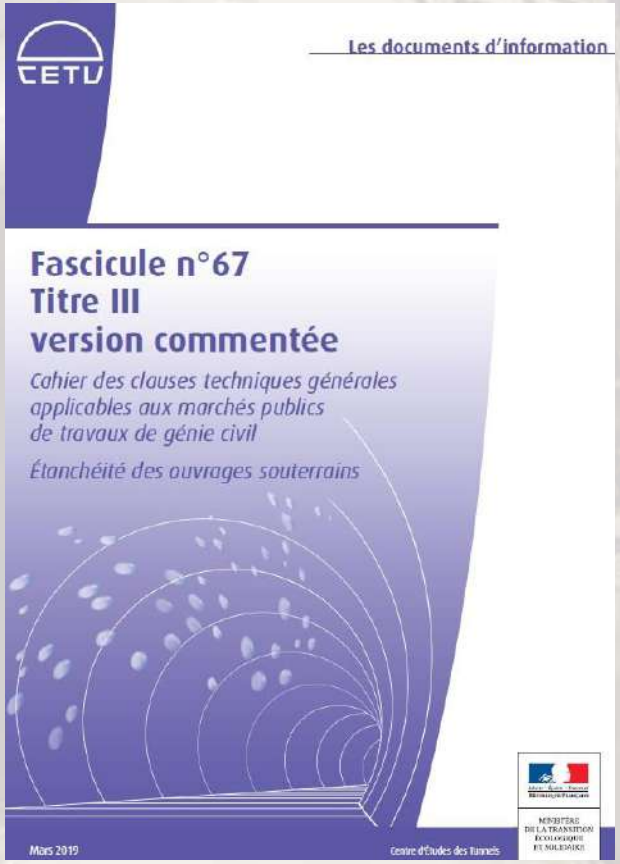
1. FONTI

1.4 STUVA - Forschung + Praxis 54



1. FONTI

1.3 CETU - Fascicolo 67, Titolo III



2. INFILTRAZIONI

2.1 attraverso le fessure sul calcestruzzo

cap. 5.2.3

2. INFILTRAZIONI

2.2 nell’interfaccia con inserti incorporati

cap. 5.2.3

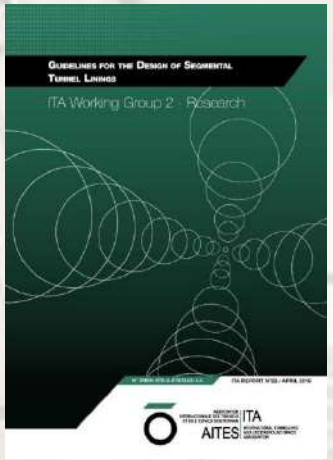
2. INFILTRAZIONI

2.3 nella guarnizione di sigillatura

cap. 5.1.4.2

3. INSTALLAZIONE DEL CONCIO

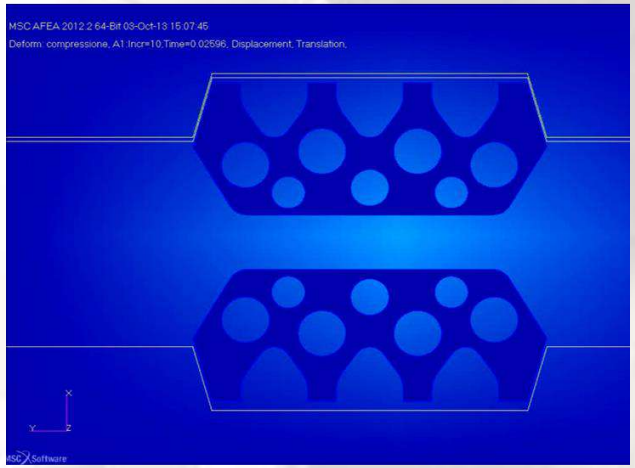
cap. 10.5

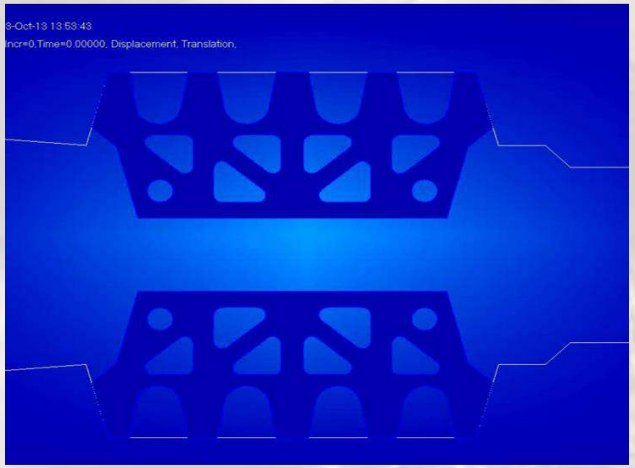


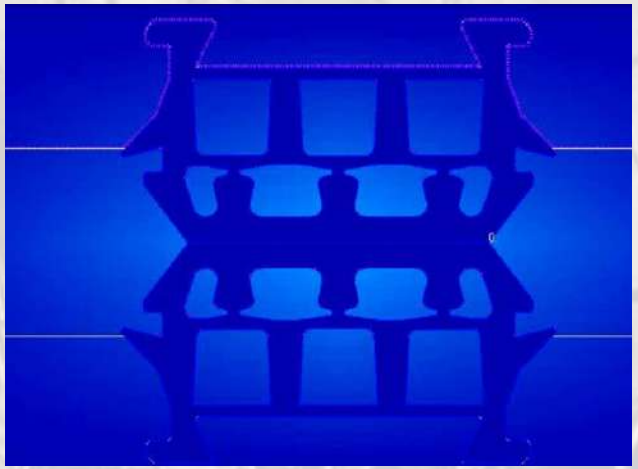
4. STRATEGIA INNOVATIVA

cap. 5.1.2

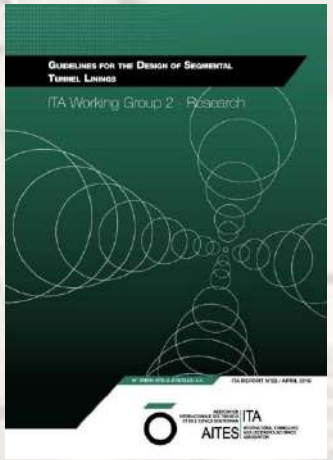
5. GEOMETRIA DELLA GUARNIZIONE





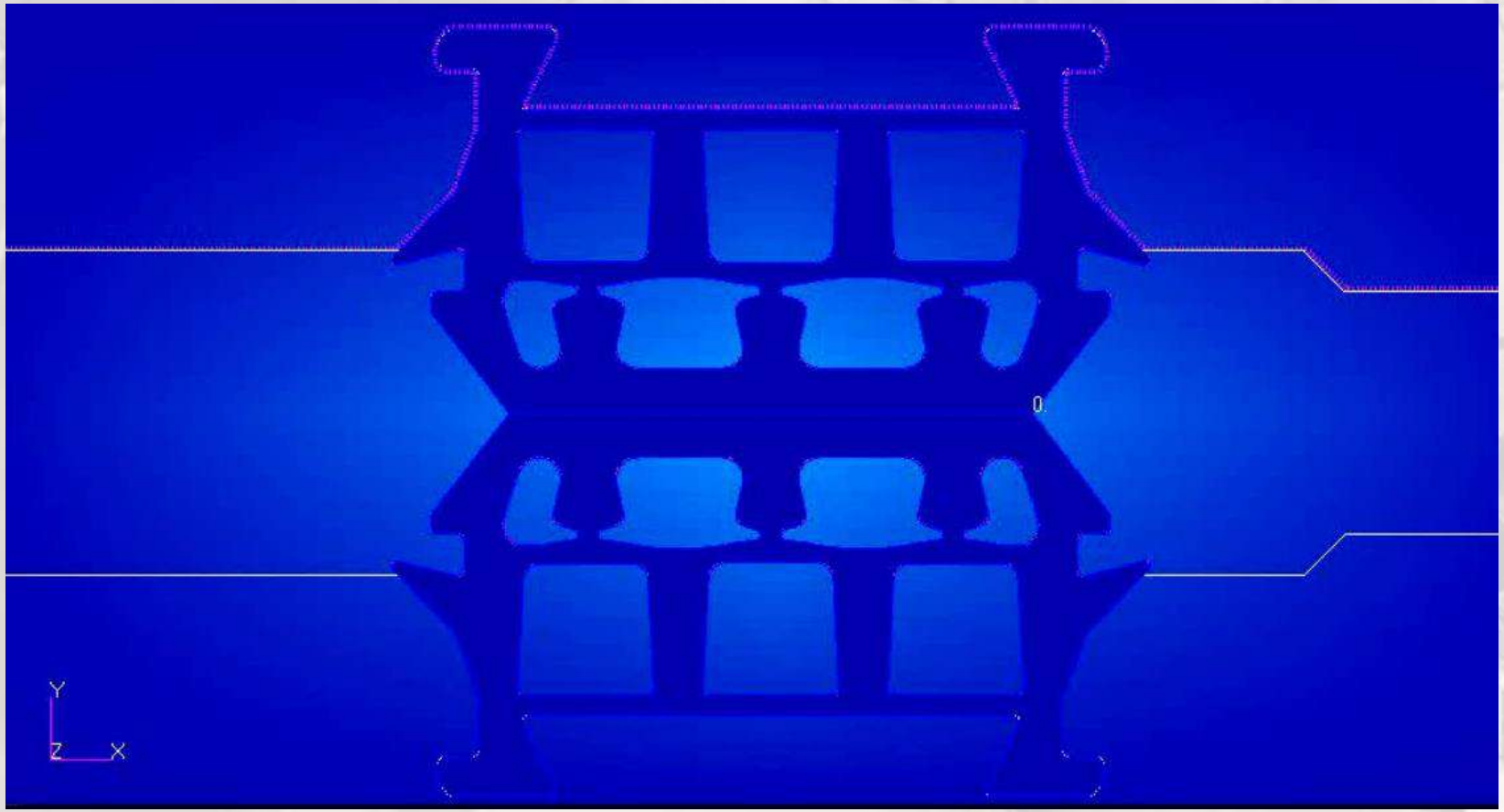


cap. 10.2



5. GEOMETRIA DELLA GUARNIZIONE

5.1 VIRTUALIZZAZIONE SPERIMENTALE



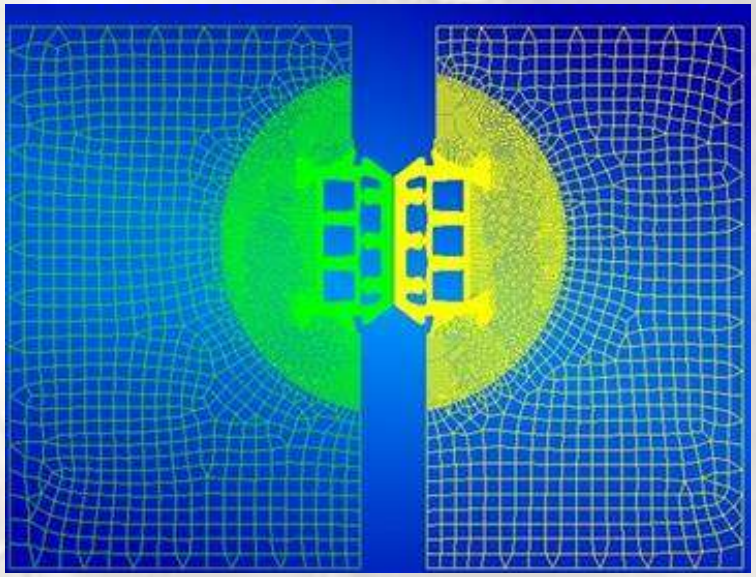
5. GEOMETRIA DELLA GUARNIZIONE

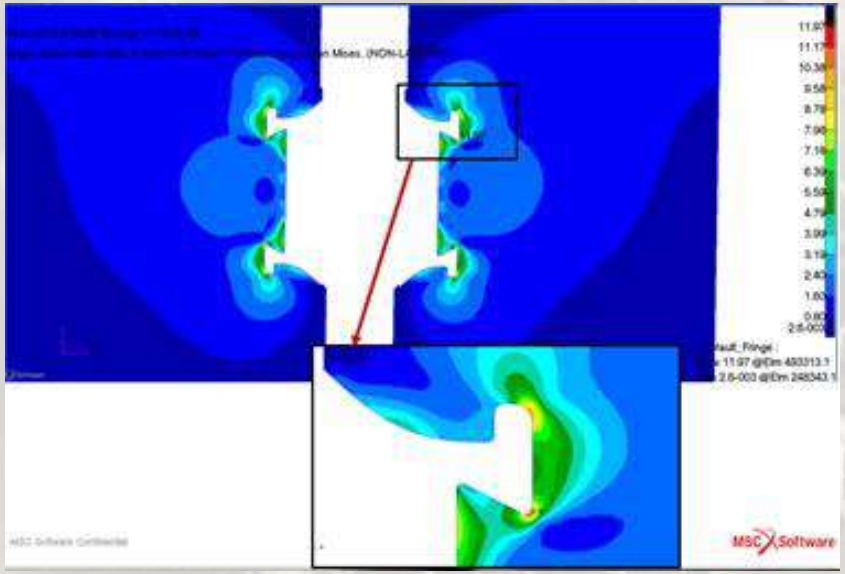
5.2 SPINTA IDROSTATICA

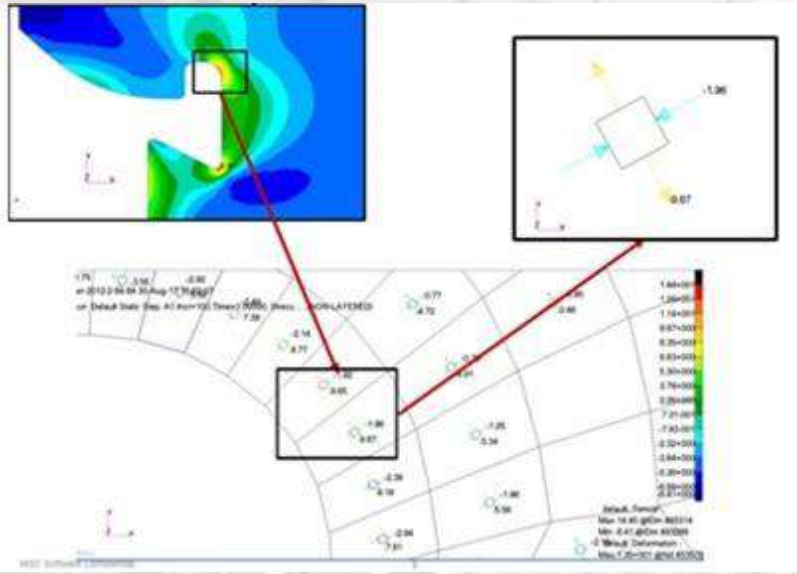
PRESSIONE IDROSTATICA

5. GEOMETRIA DELLA GUARNIZIONE

5.3 EFFETTI DELLA GUARNIZIONE SUL CALCESTRUZZO

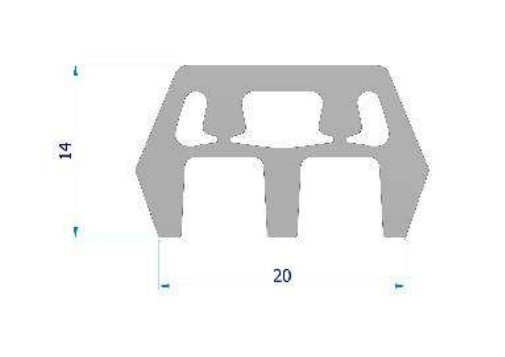


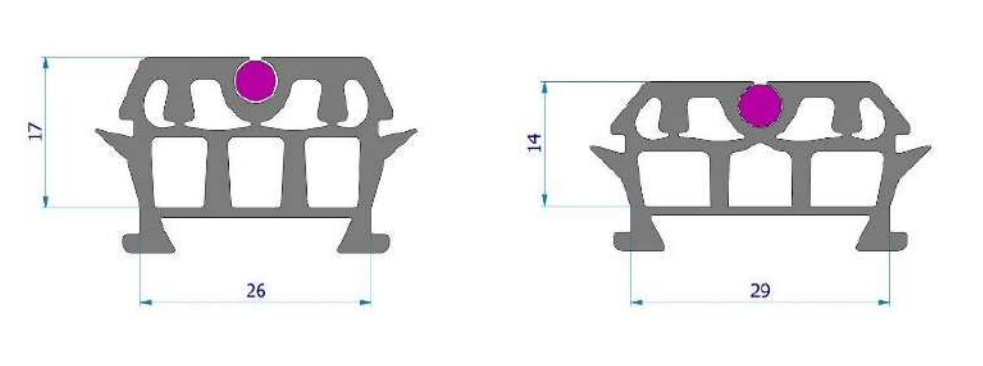




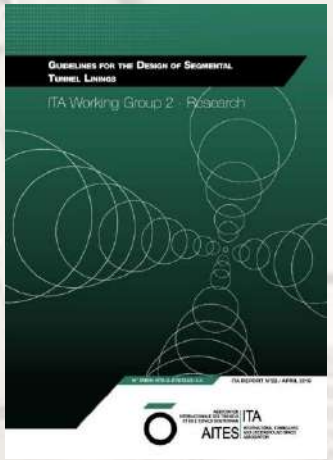
6. TAGLIA DELLA GUARNIZIONE

1/2





cap. 10.4



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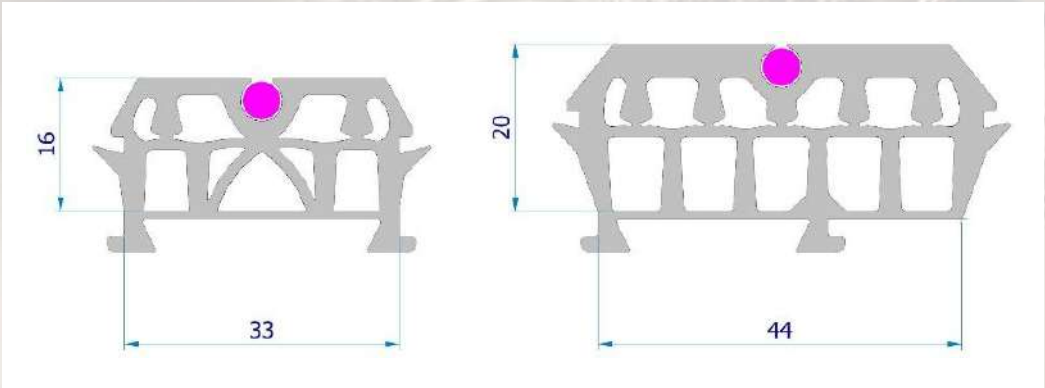
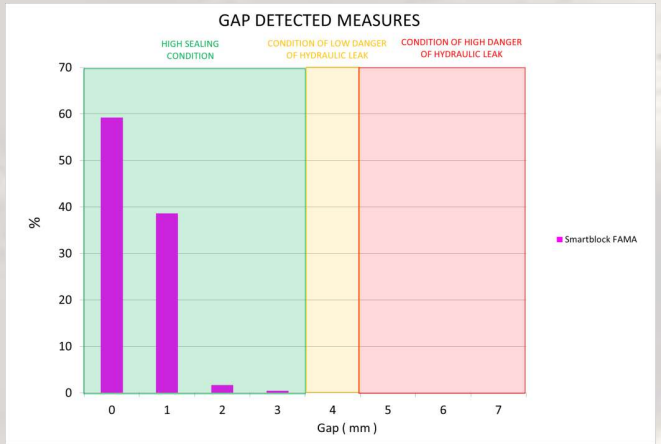
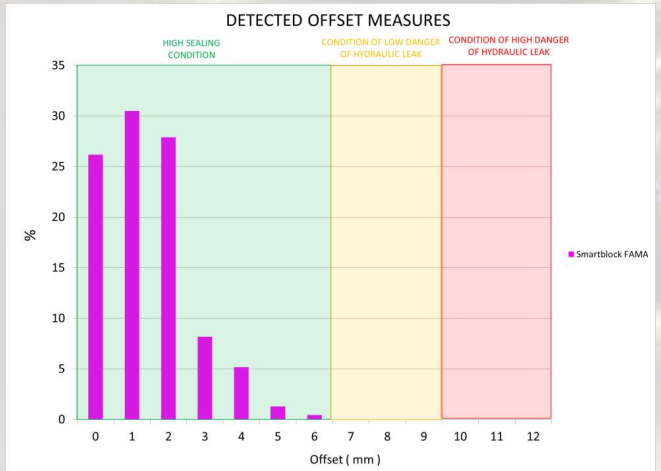


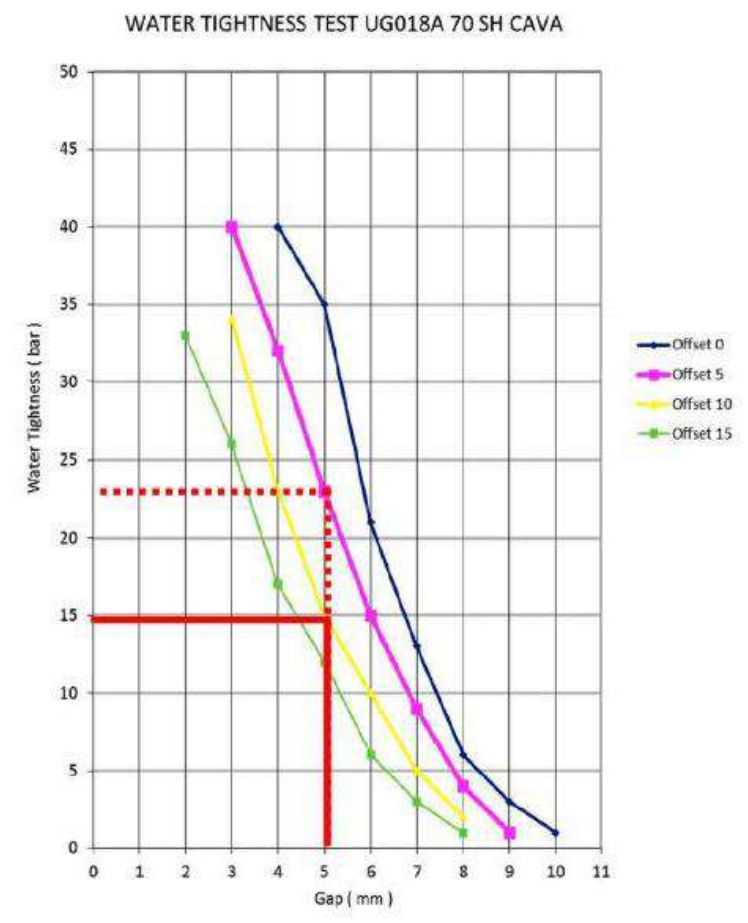
cap. 5.1.4.1

6. TAGLIA DELLA GUARNIZIONE

2/2

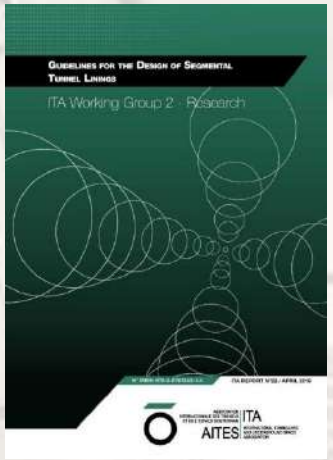






cap. 4.1

cap. 10.4



cap. 5.1.4.1

7. TIPO FISSAGGIO GUARNIZIONE AL CONCIO

7.1 IMPIEGO DEI CONNETTORI

cap. 4.1

7. TIPO FISSAGGIO GUARNIZIONE AL CONCIO

7.2 SCELTA TIPO FISSAGGIO

7. TIPO FISSAGGIO GUARNIZIONE AL CONCIO

7.3 FISSAGGIO GUARNIZIONE ANCORATA

1/2

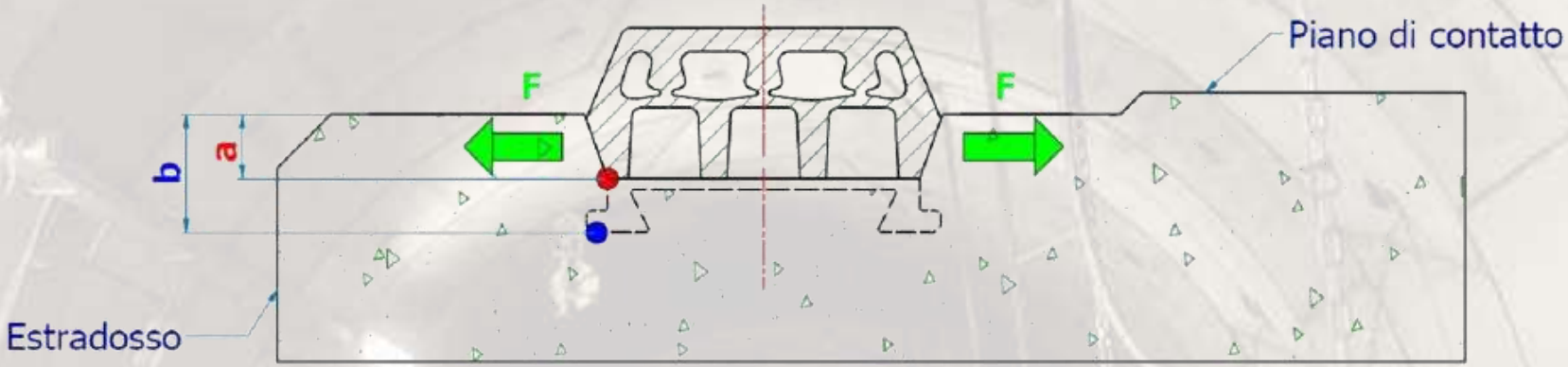
7. TIPO FISSAGGIO GUARNIZIONE AL CONCIO

7.2 FISSAGGIO GUARNIZIONE ANCORATA

2/2

8. PROBLEMATICHE IMPIEGO GUARNIZIONE ANCORATA 1/3

8. PROBLEMATICHE IMPIEGO GUARNIZIONE ANCORATA 2/3



cap. 4.1

cap. 5.1.1.3

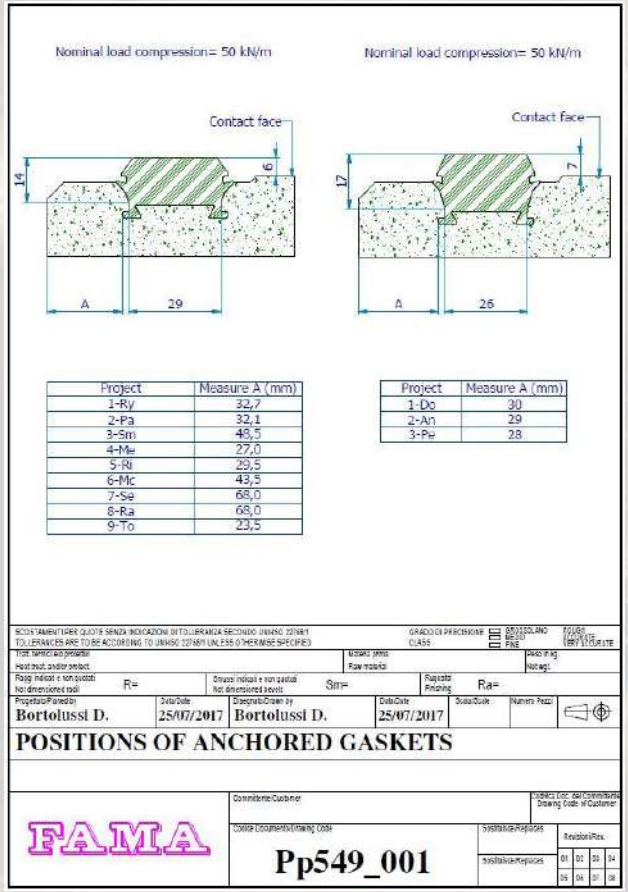
8. PROBLEMATICHE IMPIEGO GUARNIZIONE ANCORATA 3/3

cap. 5.1.1.3

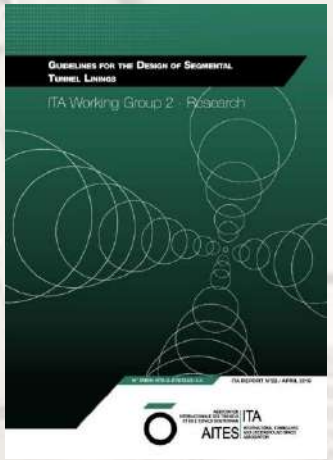
9. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA

9.1 POSIZIONE DAL BORDO DEL CONCIO

cap. 4.2



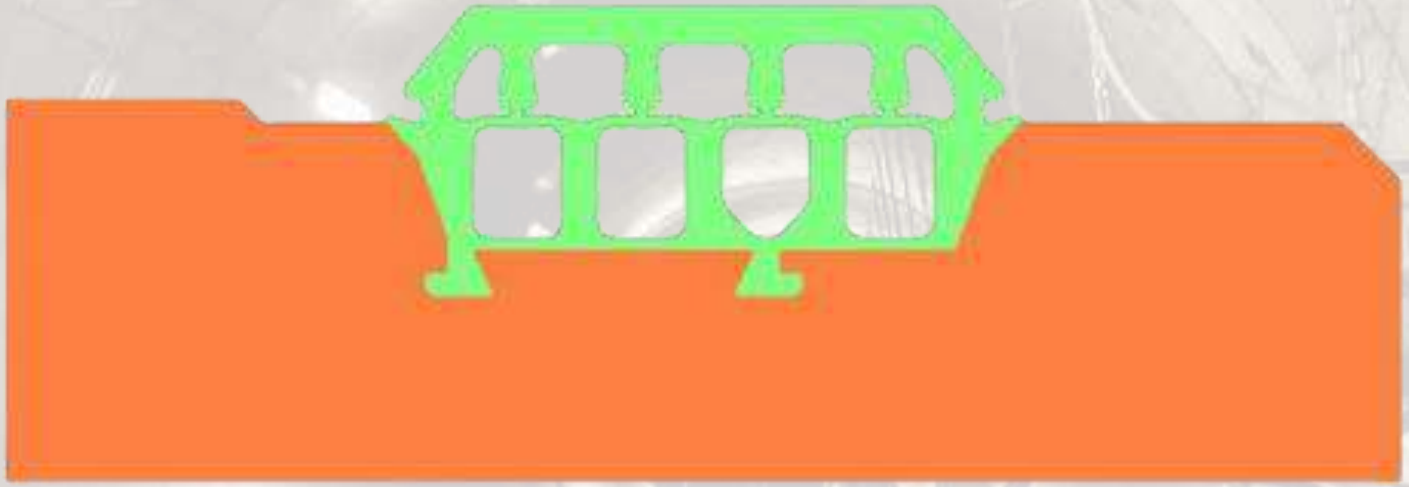
cap. 10.6



cap. 5.1.1.3

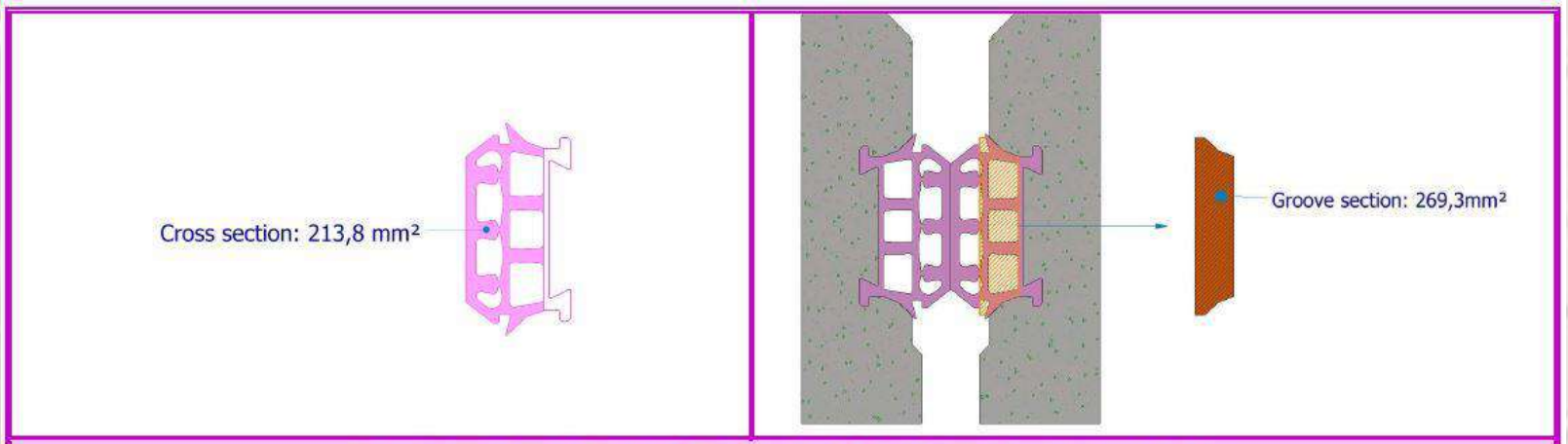
9. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA

9.2 ALLONTANAMENTO DAL BORDO DEL PIEDE DI ANCORAGGIO



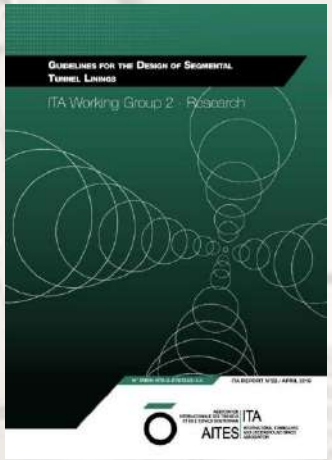
9. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA

9.3 GRADO DI RIEMPIMENTO



CAVITY FILLING COEFFICIENT= 213.8 / 269.3 × 100 = **79%**

cap. 10.6

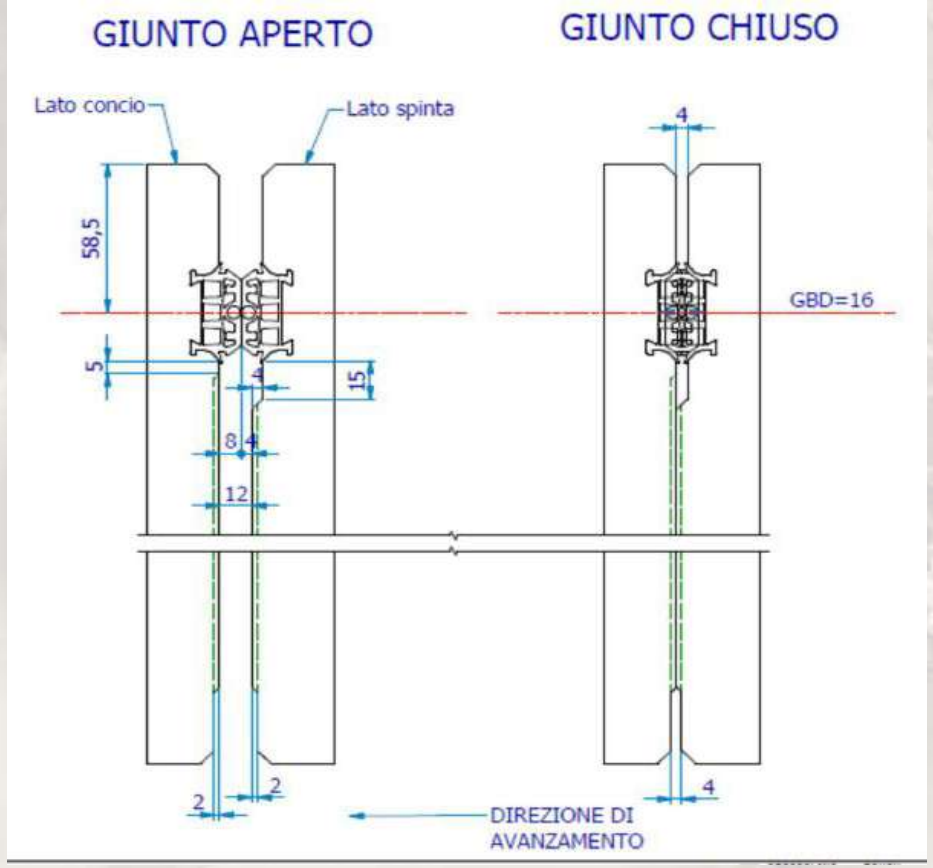


cap. 4.4

9. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA

9.4 POSIZIONE ASIMMETRICA DELLA GUARNIZIONE

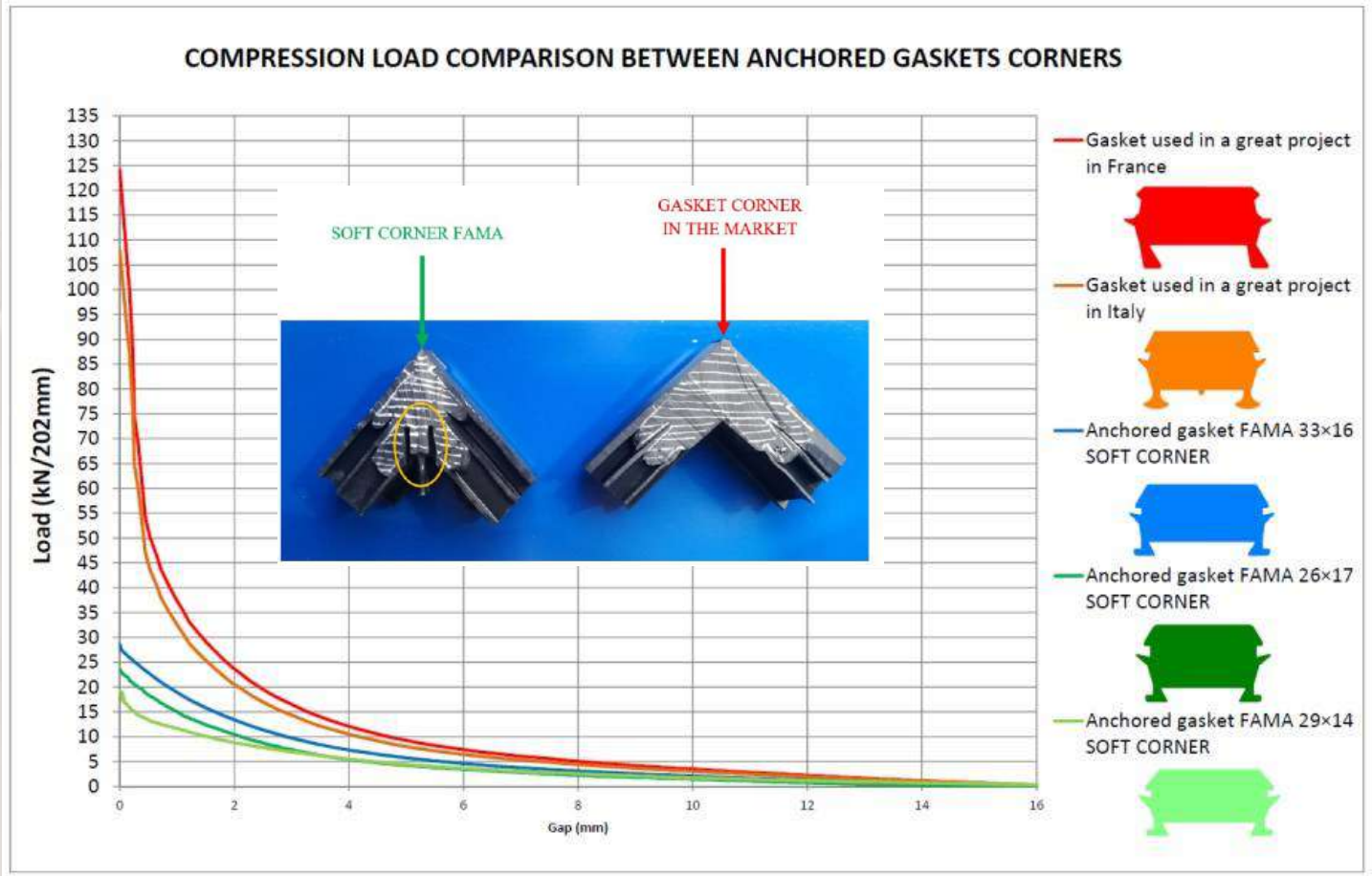
cap. 4.2 fig. 6



9. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA

9.5 STRUTTURA COSTRUTTIVA DELL'ANGOLO

cap. 4.4 4.5



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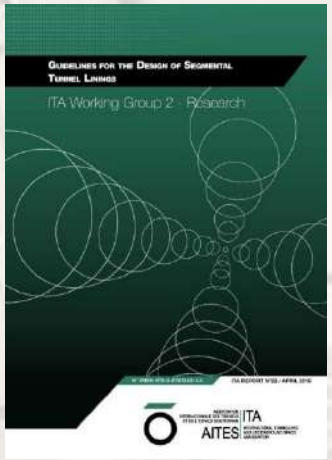


9. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA

9.6 DUTTILITÀ ELEVATA DELLE MESCOLE DI GIUNZIONE

9. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA

9.7 RUOLO DETERMINANTE LUBRIFICAZIONE

cap. 4.9

INNOVAZIONE FAMA

INNOVAZIONE FAMA

INNOVAZIONE FAMA

INNOVAZIONE FAMA

FAMA

HIGH INTENSITY OF INNOVATION

INNOVAZIONE FAMA

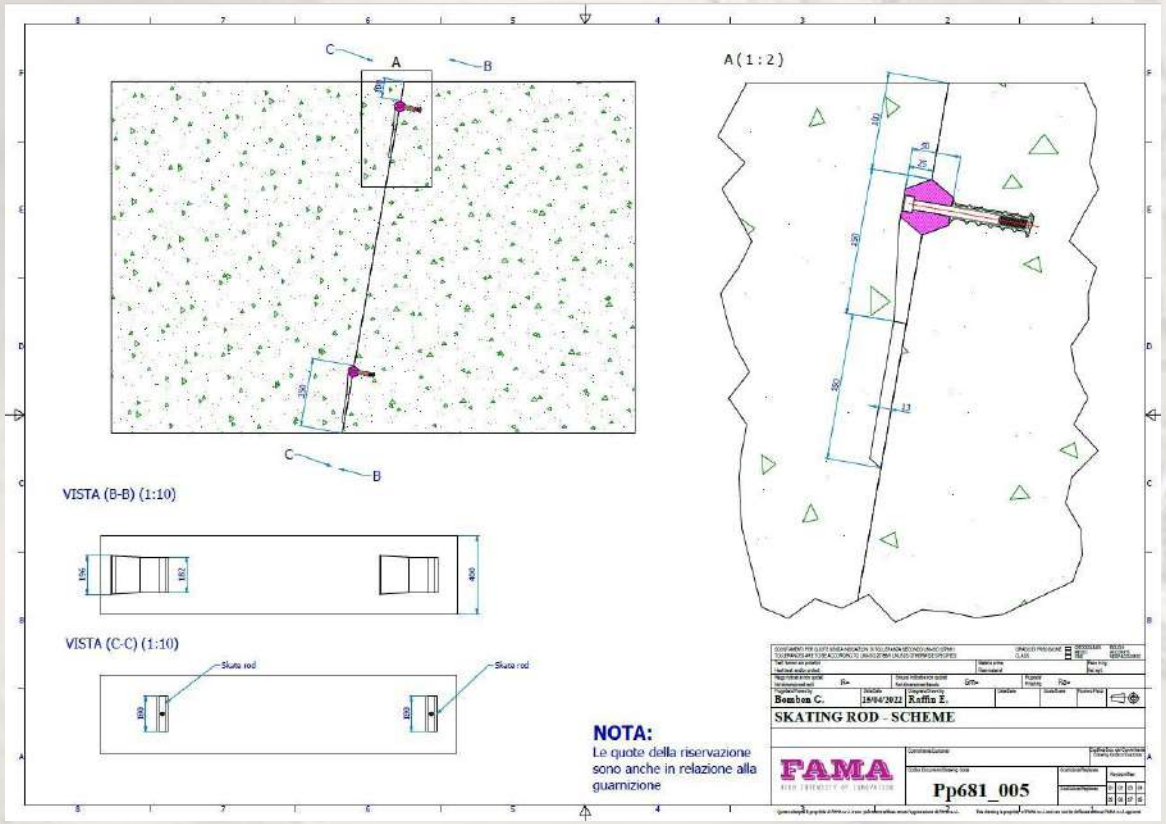
INNOVAZIONE FAMA

INNOVAZIONE FAMA

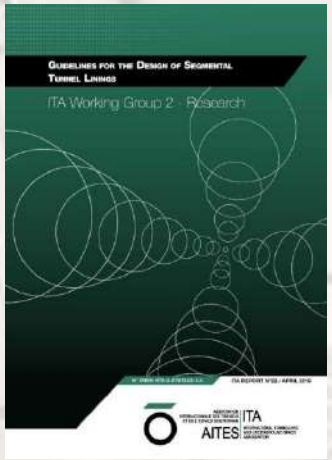
INNOVAZIONE FAMA

10. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA - INNOVAZIONE FAMA

10.1 Pattino di guida

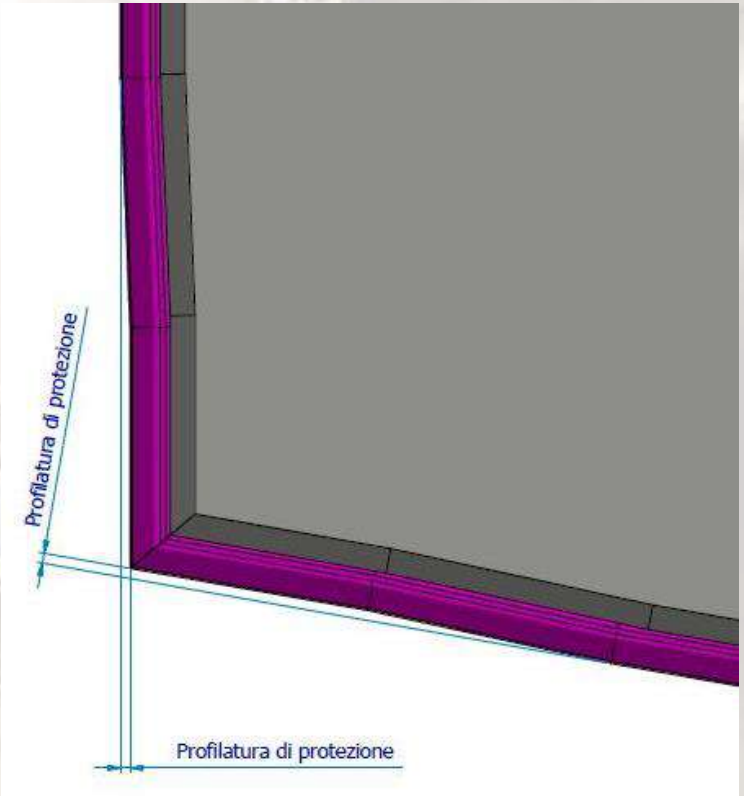


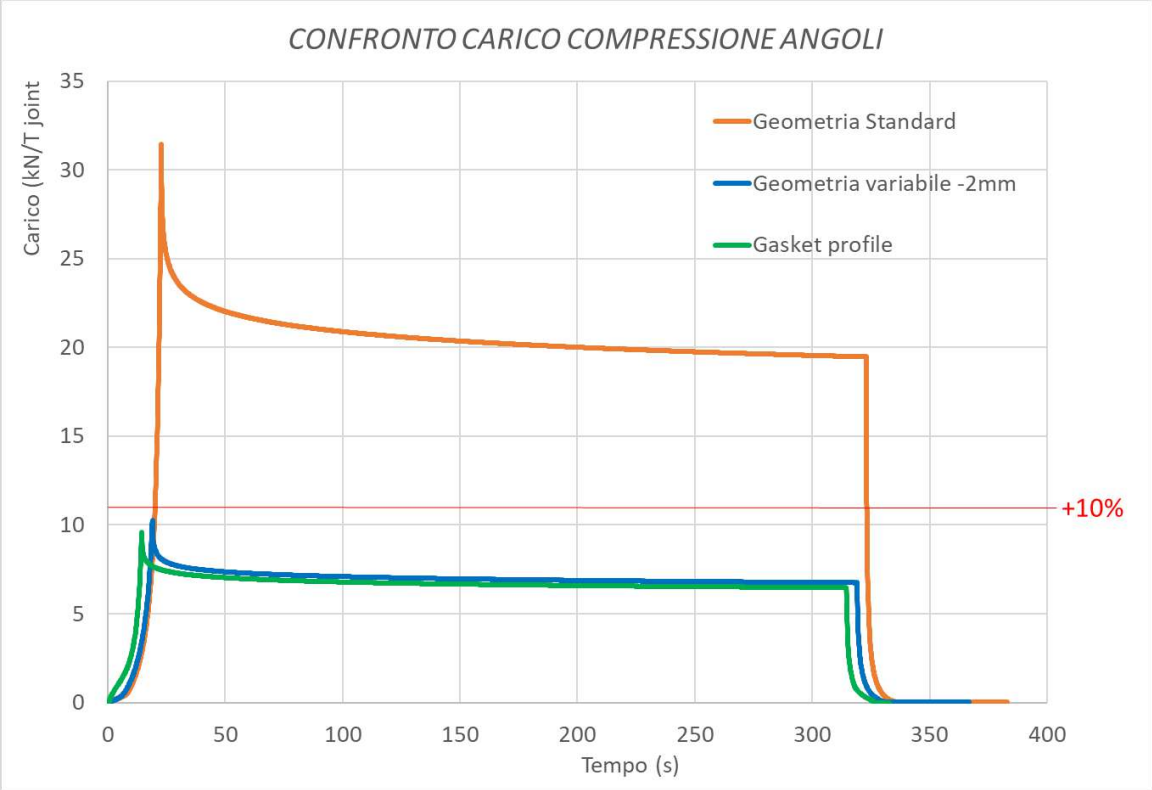
cap. 11.1



10. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA - INNOVAZIONE FAMA

10.2 Angolo a geometria variabile

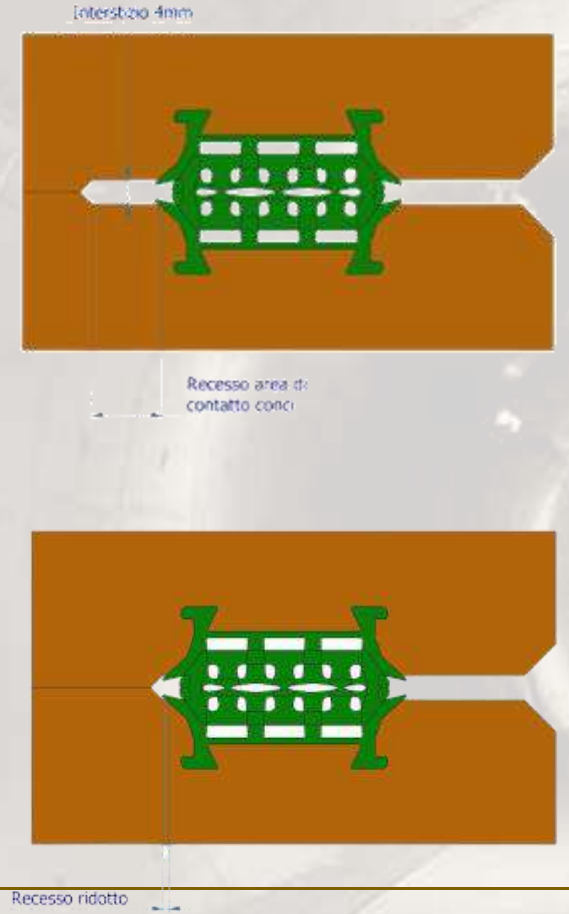


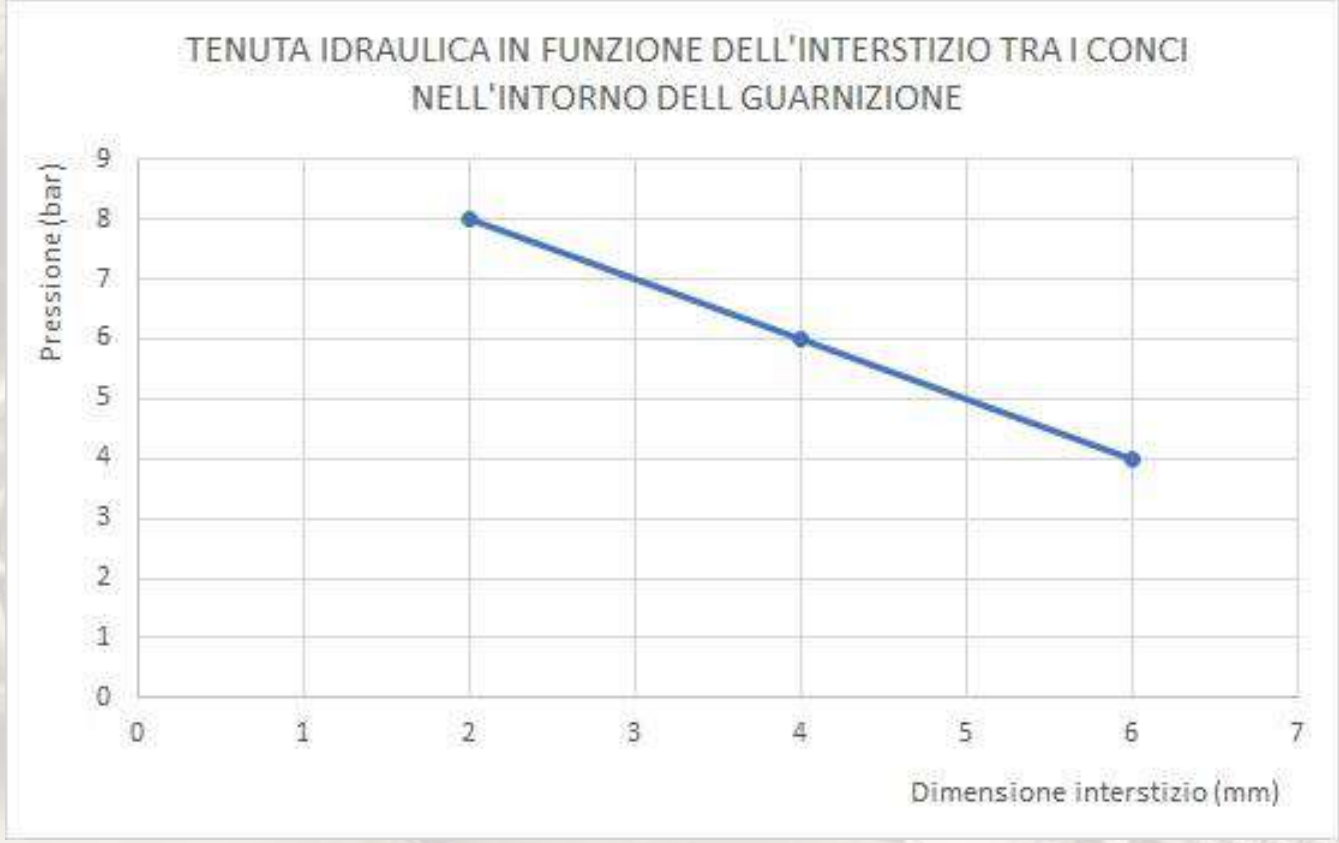


10. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA - INNOVAZIONE FAMA

10.3 Riduzione del recesso

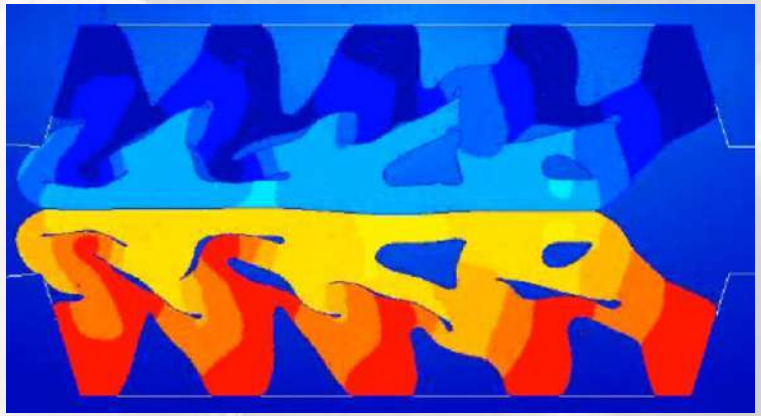
cap. 4.2

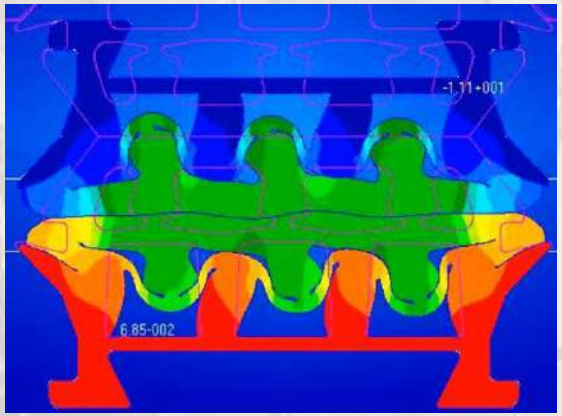




10. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA - INNOVAZIONE FAMA

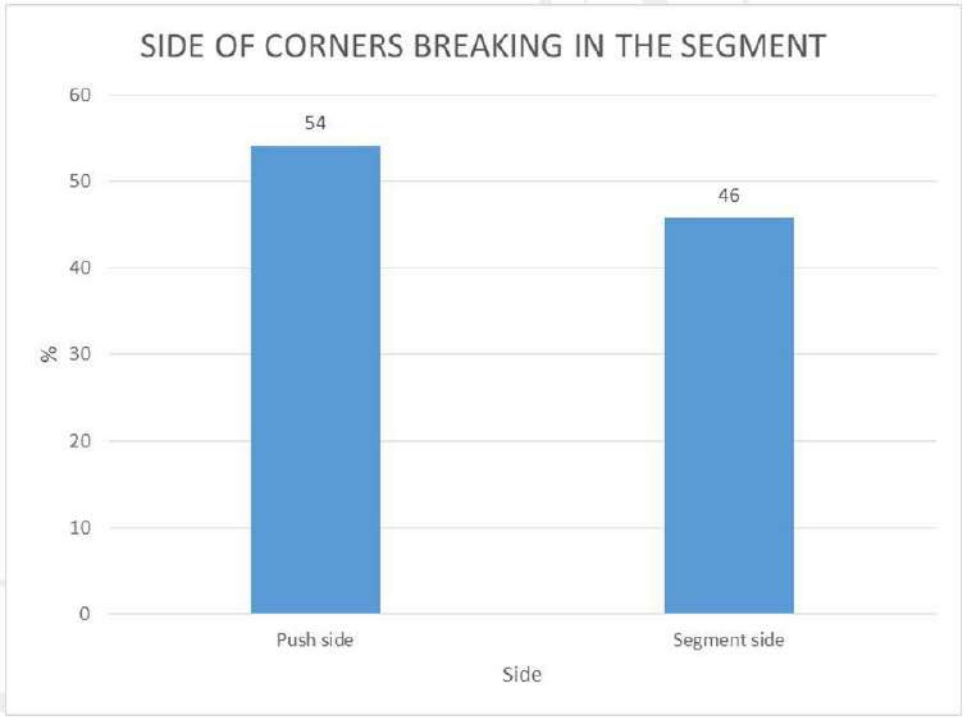
10.4 Stabilità nella compressione

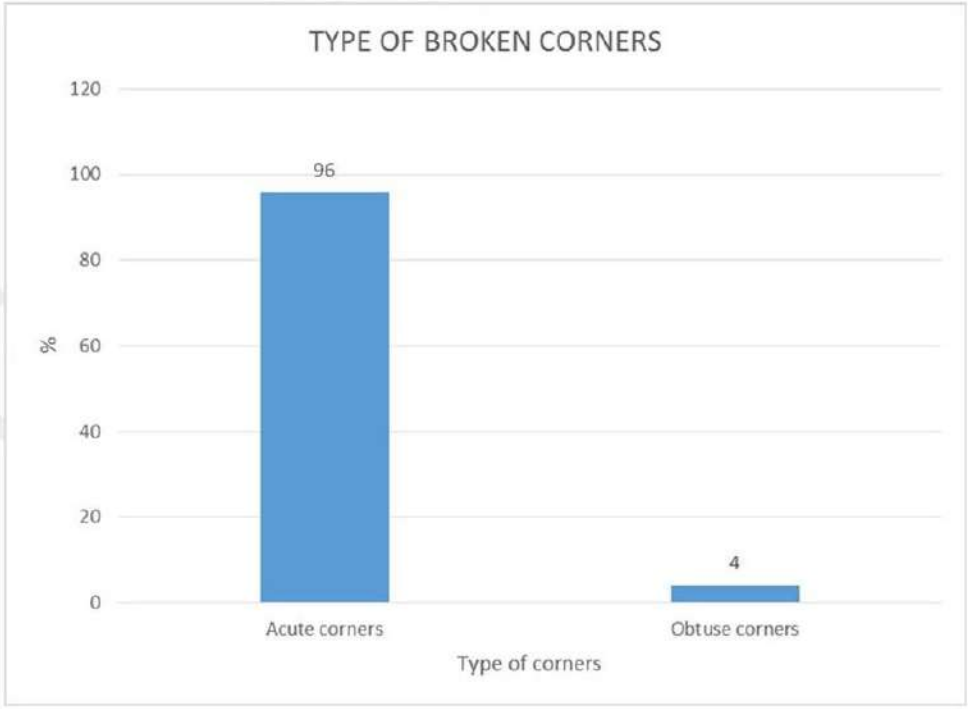




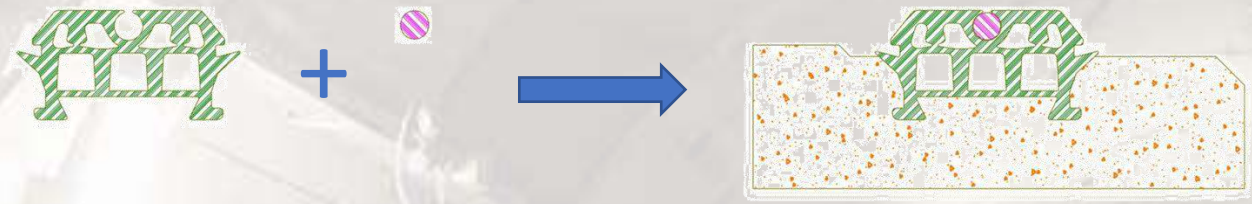
11. MITIGAZIONE EFFETTI NEGATIVI GUARNIZIONE ANCORATA E GEOMETRIA DEI CONCI

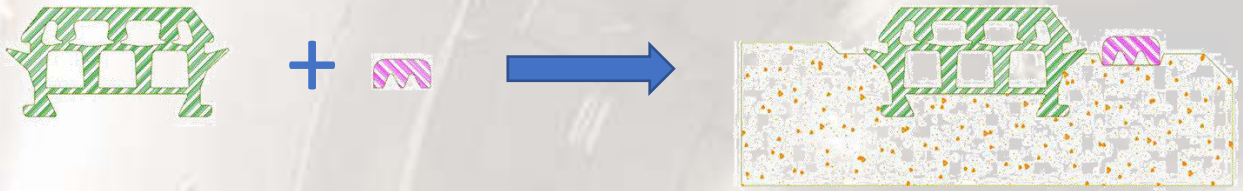
cap. 4.5



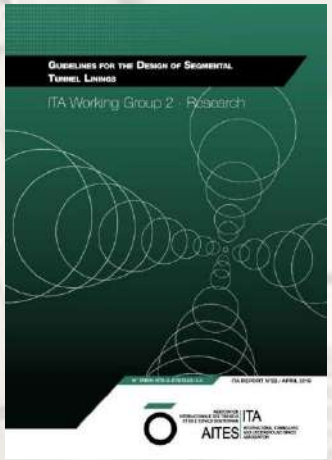


12. INFLUENZA DELLA PRESSIONE DI ESERCIZIO





cap. 10.2



13. DOPPIA GUARNIZIONE

14. TOLLERANZE GUARNIZIONE

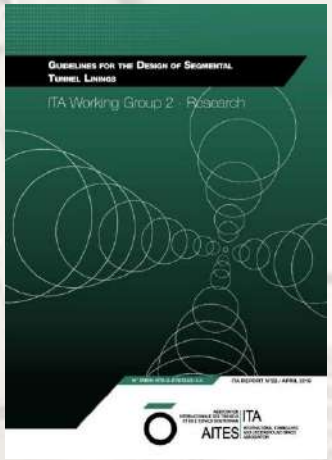
Klasse Class	**Profilhöhe und -breite (nominell)** Profile height and width (nominal)				
	≤ 10 mm	≤ 16 mm	≤ 25 mm	≤ 40 mm	≤ 63 mm
E1	± 0,4 mm ± 0.4 mm	± 0,5 mm ± 0.5 mm	± 0,7 mm ± 0.7 mm	± 0,8 mm ± 0.8 mm	± 1,3 mm ± 1.3 mm
E2	± 0,7 mm ± 0.7 mm	± 0,8 mm ± 0.8 mm	± 1,0 mm ± 1.0 mm	± 1,3 mm ± 1.3 mm	± 1,6 mm ± 1.6 mm

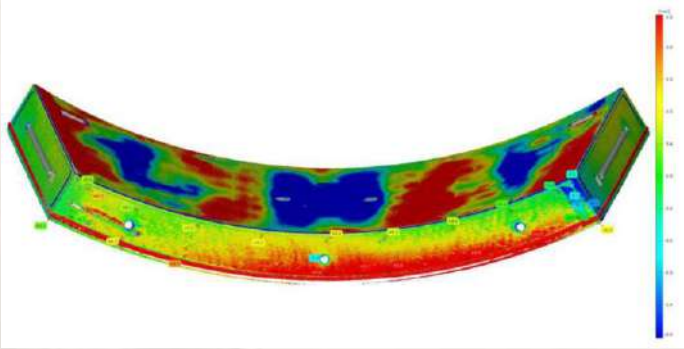
cap. 4.4
tab. 1

15. TOLLERANZE COSTRUTTIVE ANELLO

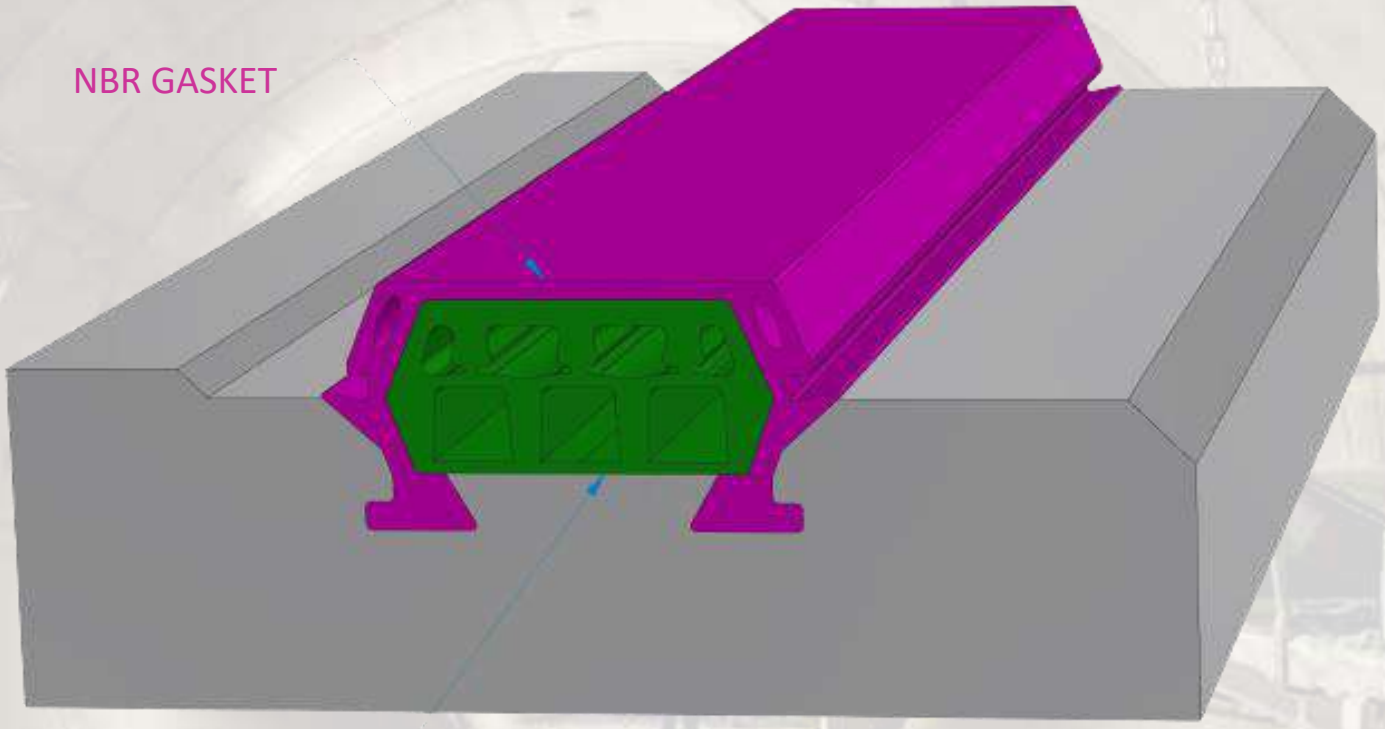
cap. 12. fig. 56

cap. 12.3

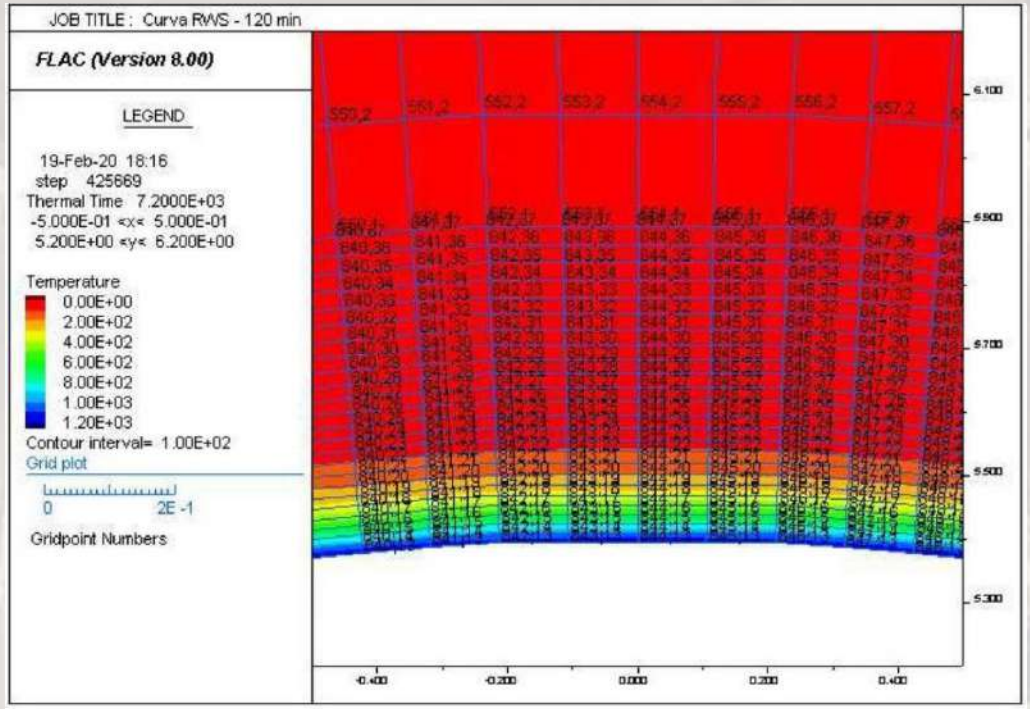


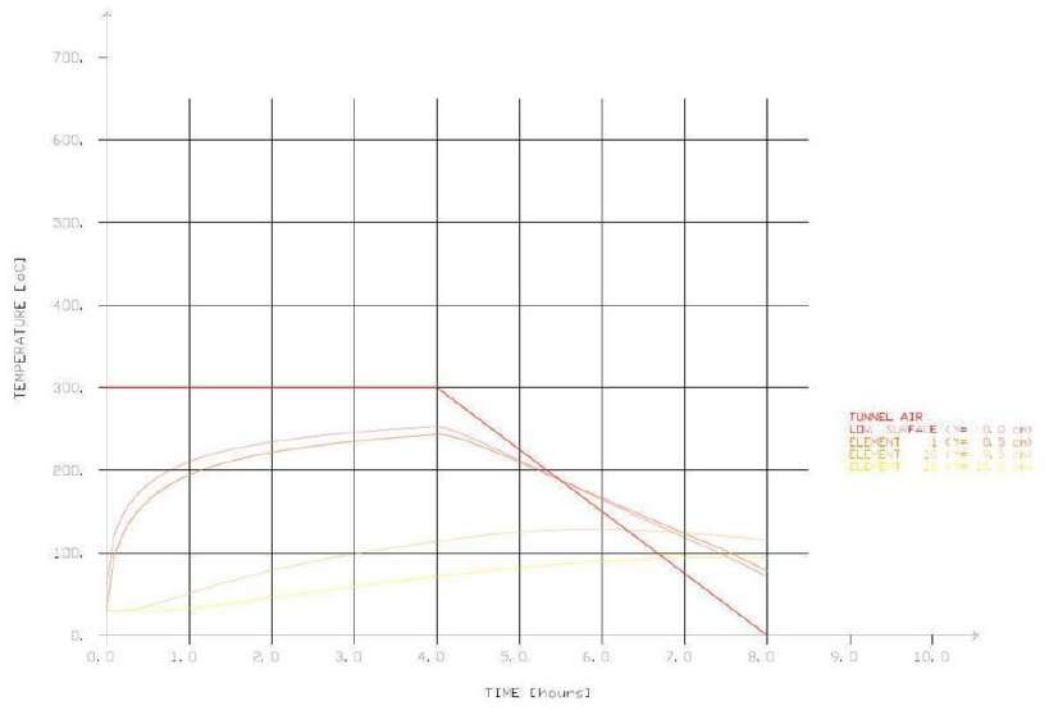


16. PRESENZA CONTAMINANTI



17. RESISTENZA AL FUOCO





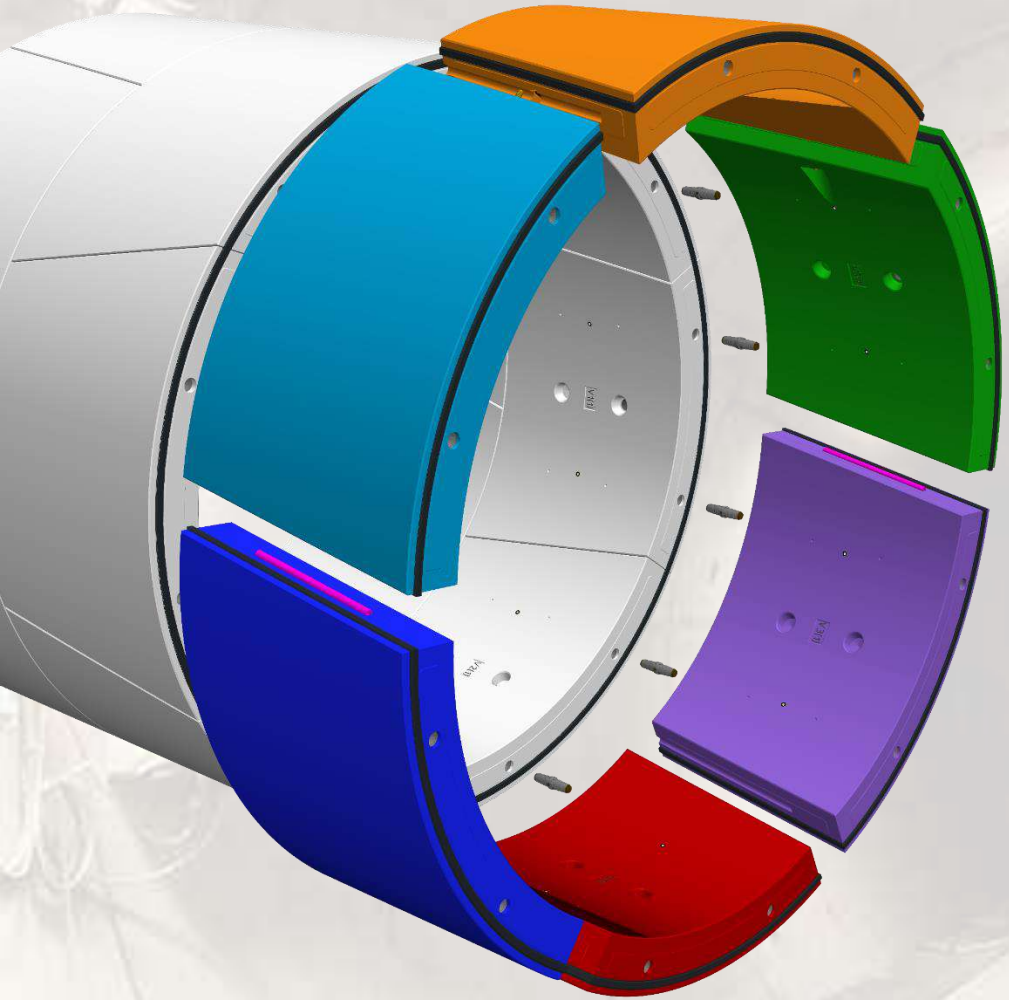
cap. 4.10

15. CONNETTORE

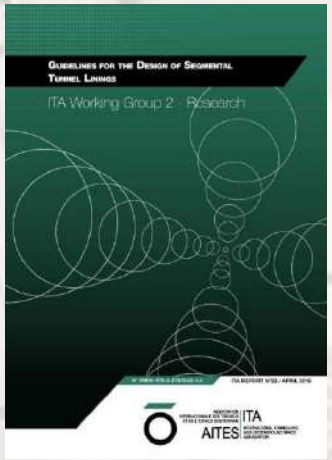
CETU GT9
GUIDE DES BONNES PRATIQUES D'ÉTANCHEMENT EN OUVRAGES SOUTERRAINS
Work in Progress

16. CARATTERISTICHE IMPIEGO CONNETTORE

1/2

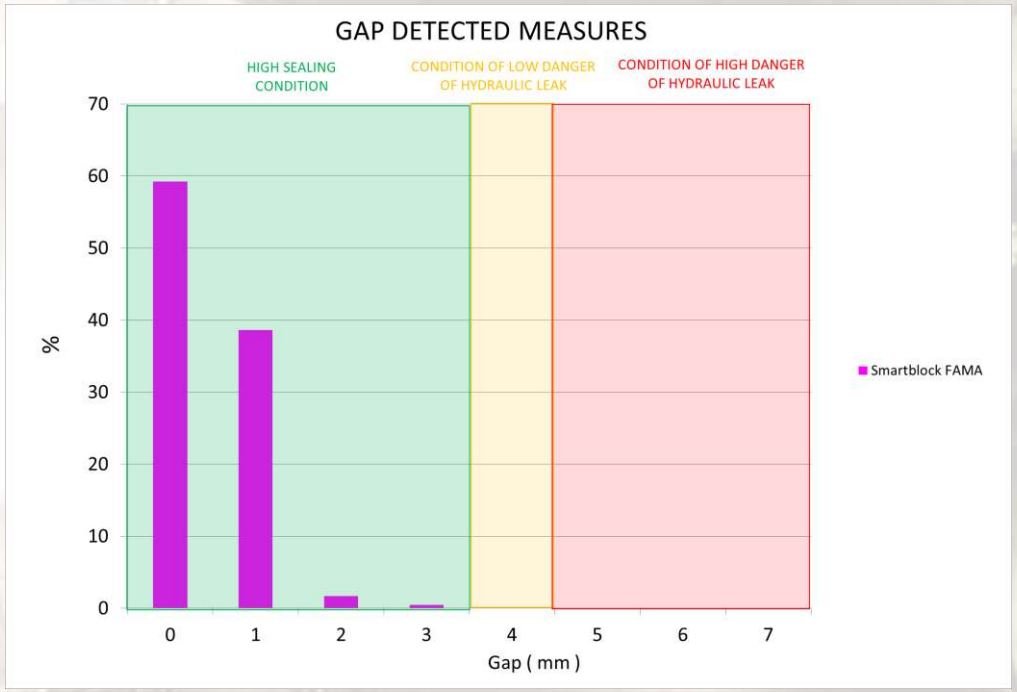


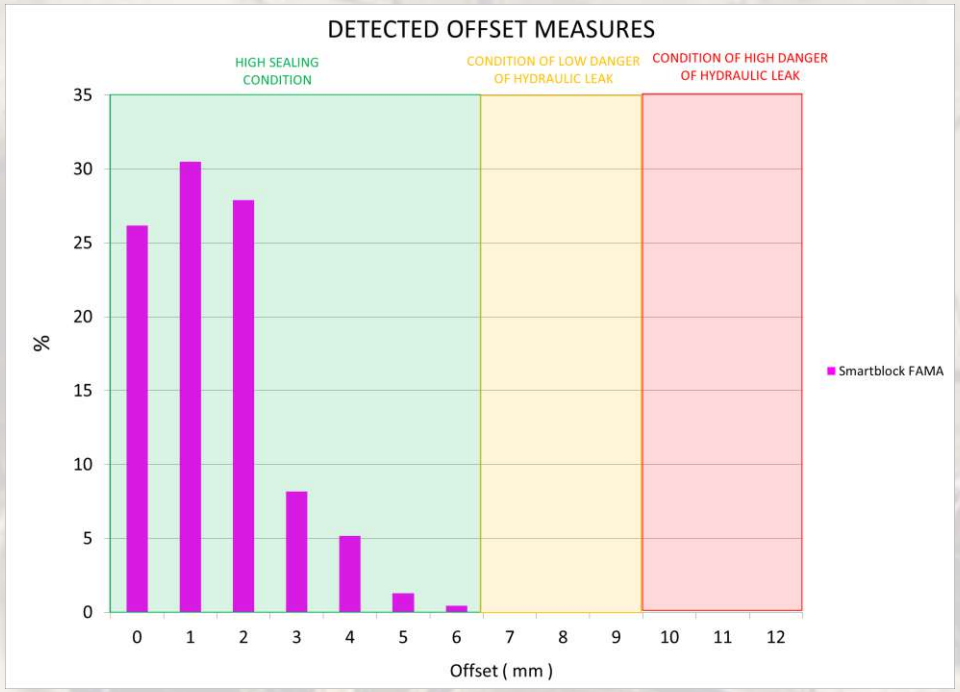
cap. 11.1



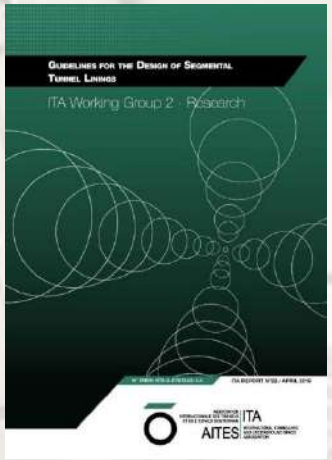
16. CARATTERISTICHE IMPIEGO CONNETTORE

1/2



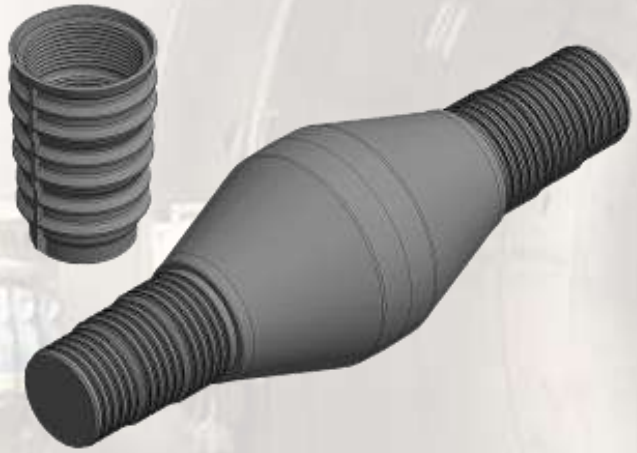


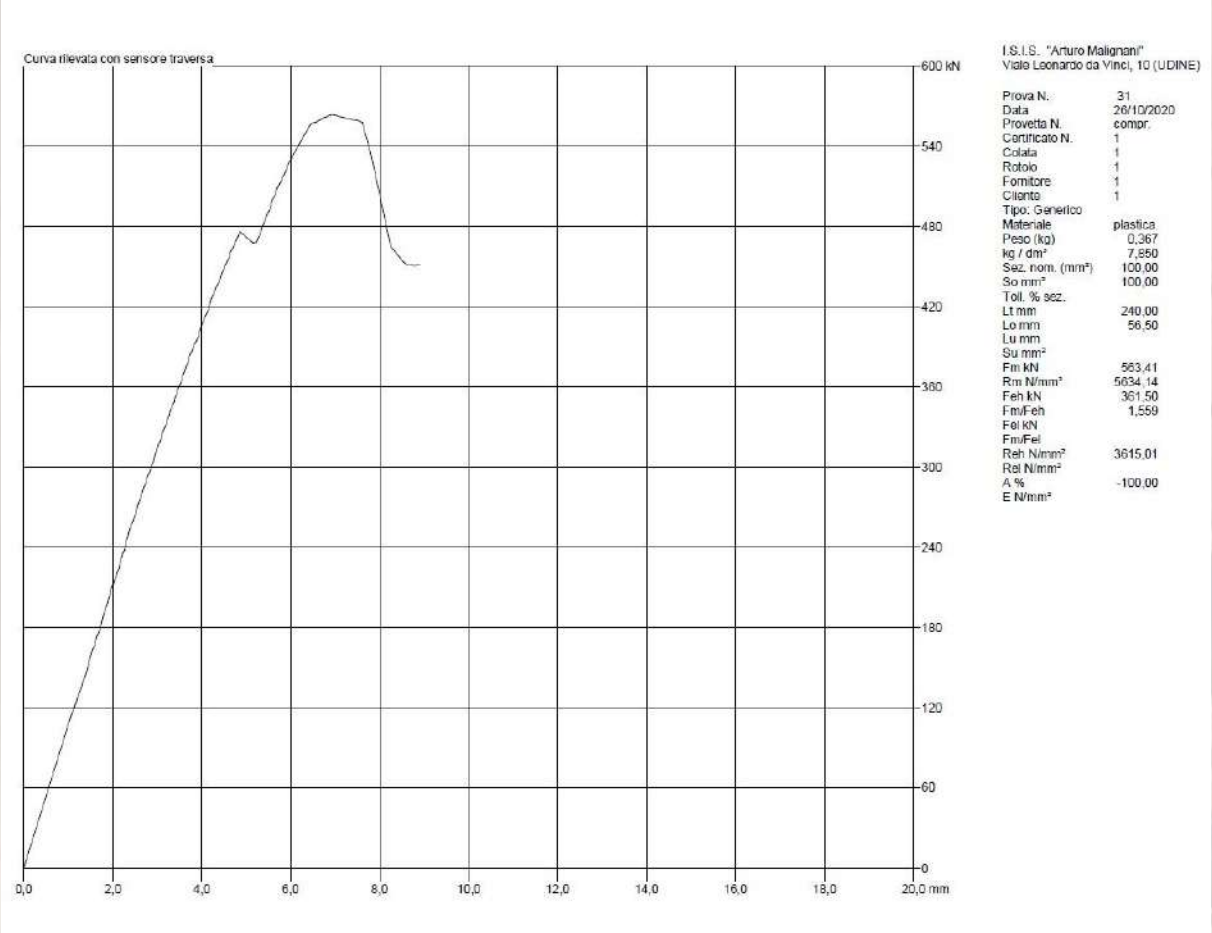
cap. 11.1



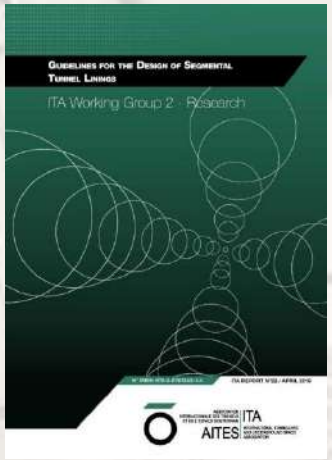
16.1 CARATTERISTICHE IMPIEGO CONNETTORE

16.1.1 ALTO TAGLIO





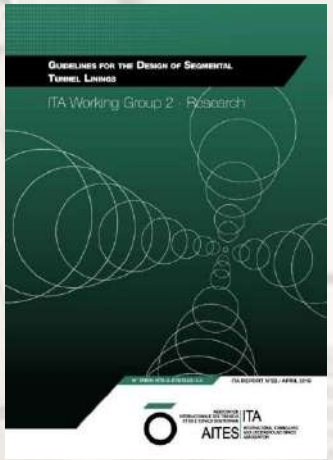
cap. 11.3



16.1 CARATTERISTICHE IMPIEGO CONNETTORE

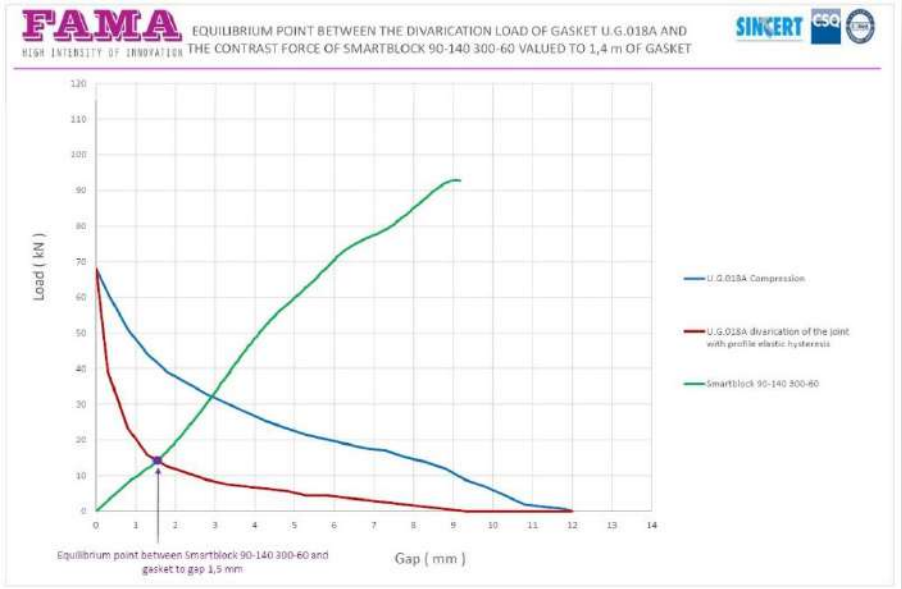
16.1.2 CONNETTORE A VITE

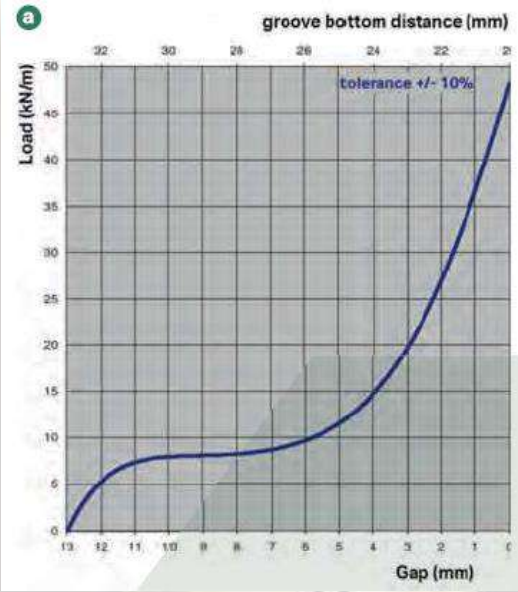
cap. 11.3

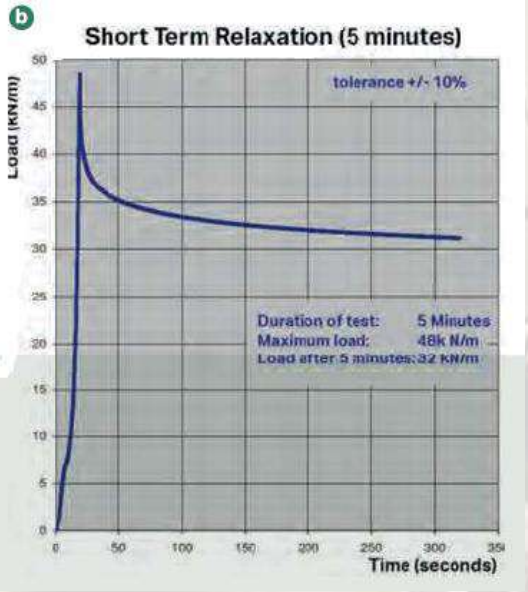


16.1 CARATTERISTICHE IMPIEGO CONNETTORE

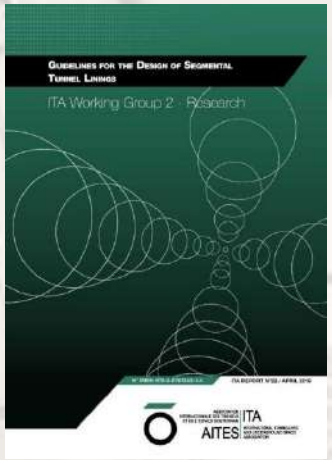
16.1.3 INTERAZIONE SISTEMA DI CONNESSIONE







cap. 10.5



17. ACCESSORI

18. CONCLUSIONI

cap. 4.4

LA SIGILLATURA È UN SISTEMA COMPETENTE