Munkavezetékek felületkezelésének elõnyei

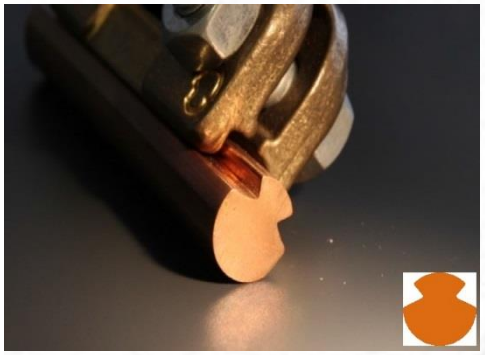
FUX Zrt.

A vezeték és kábelgyártó az elosztóhálózatok és a vasút számára

Bare Overhead Conductors

Covered Overhead Conductors, and Cables

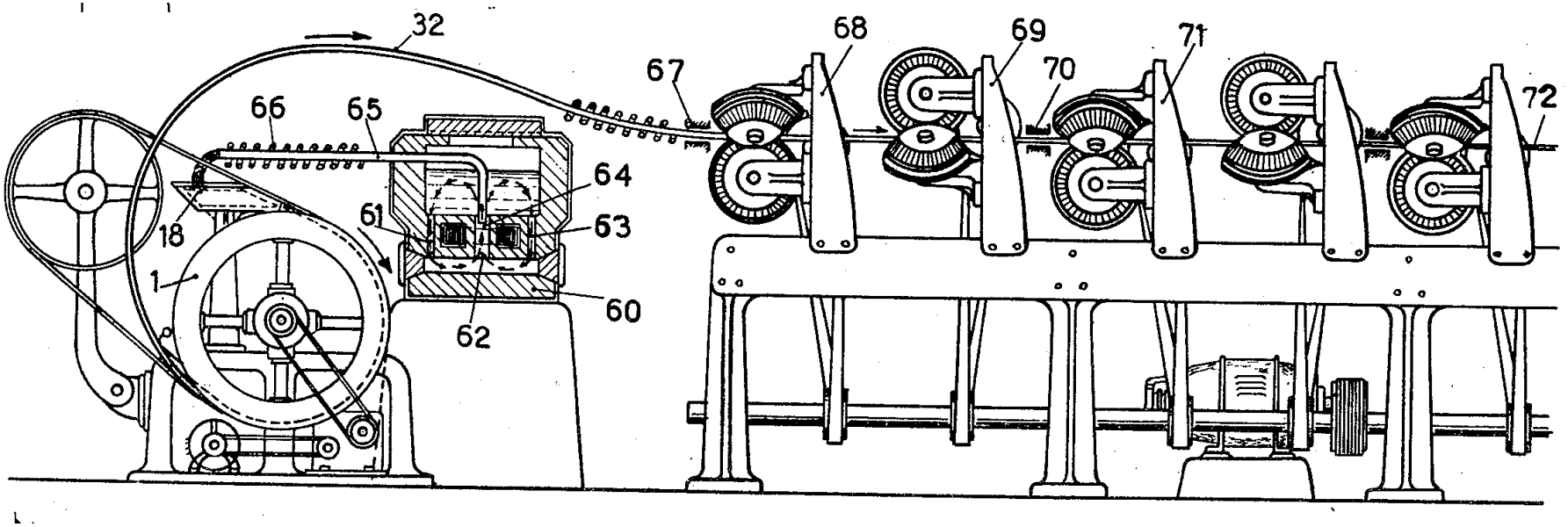
Railway



Contact wires

Stranded copper and bronze products

Stranded aluminum products


32
66
65
67
68
69
70
71
72
64
61
63
18
1
60
62

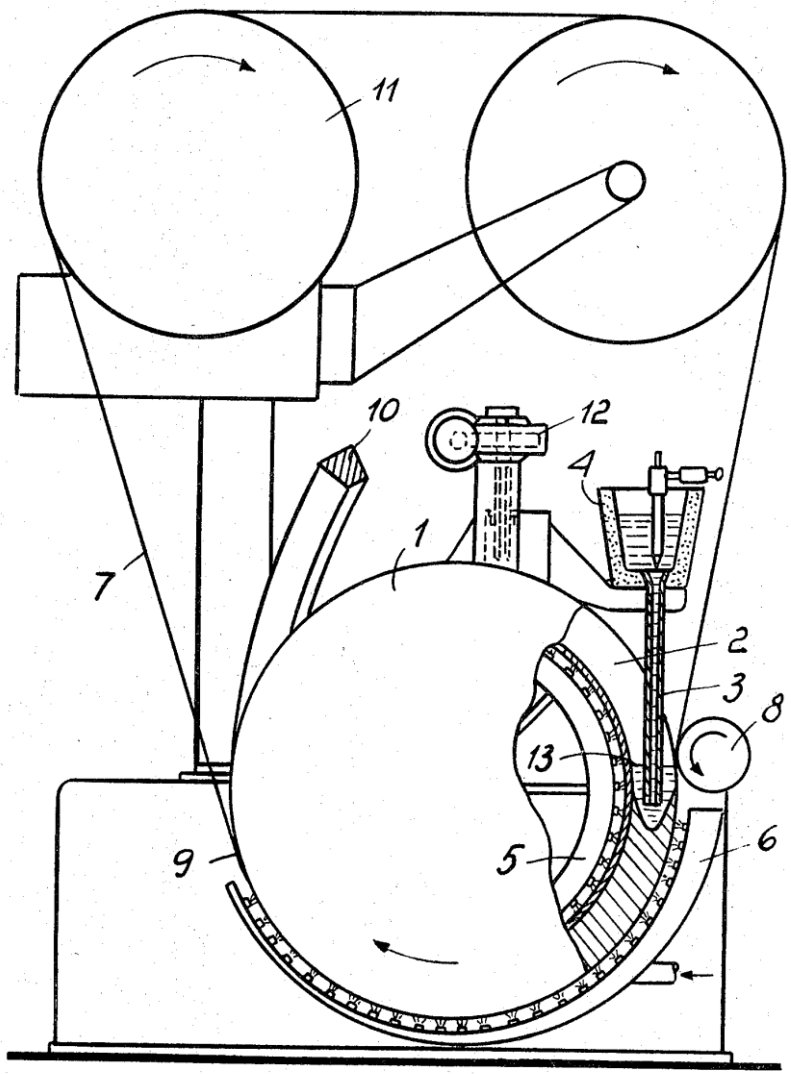


Fig. 1

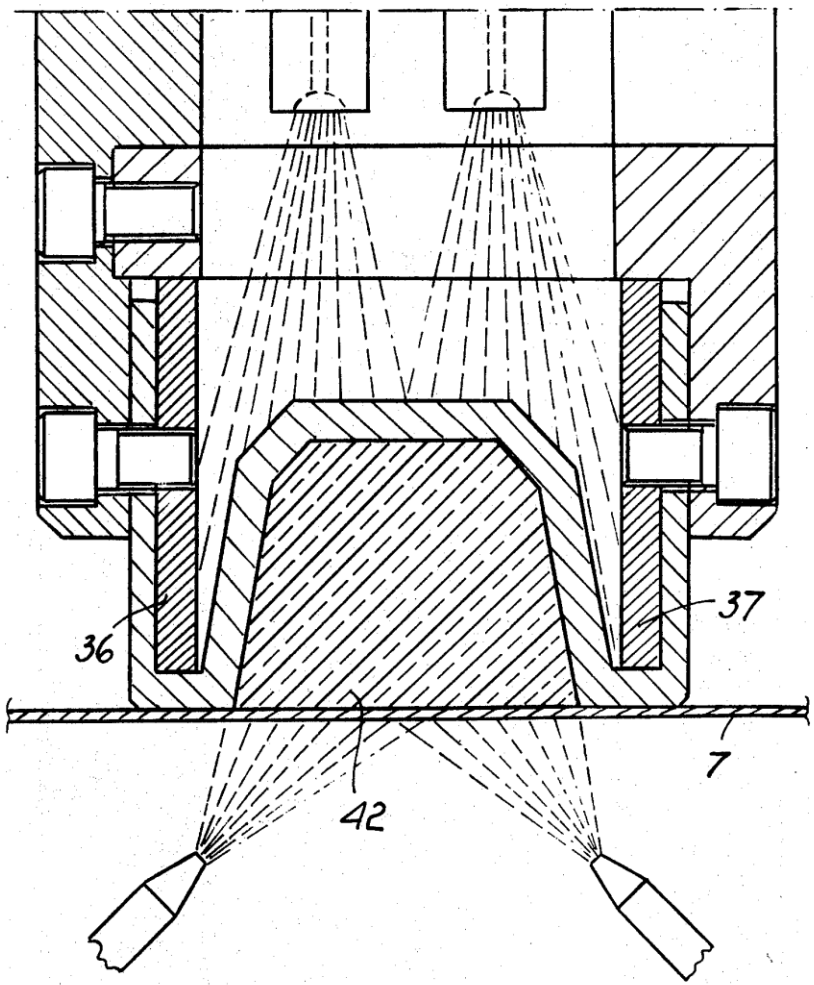


Fig. 4

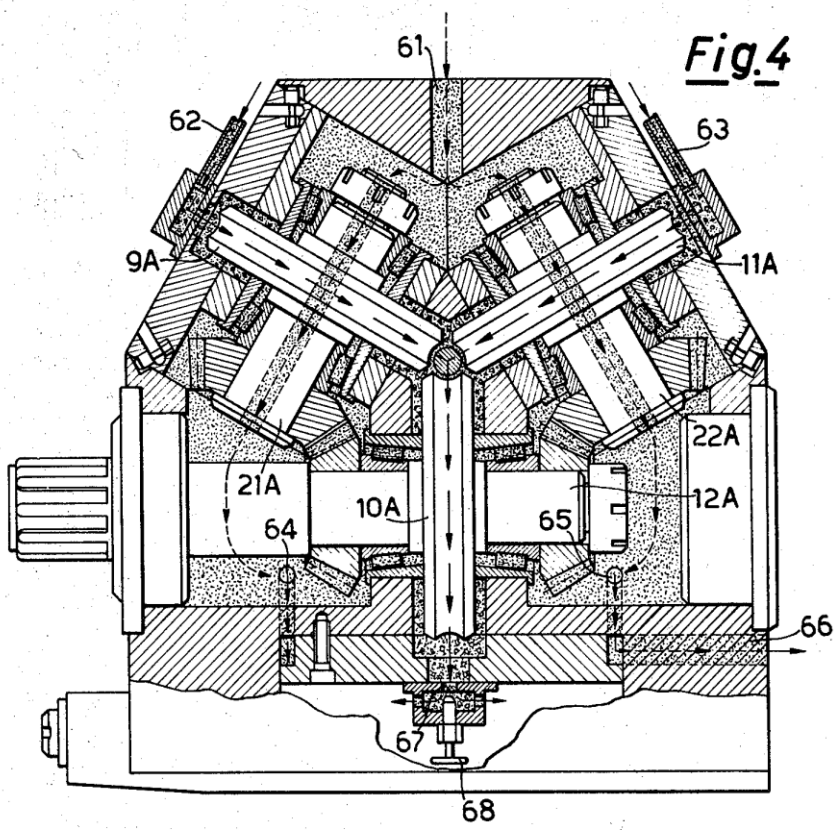
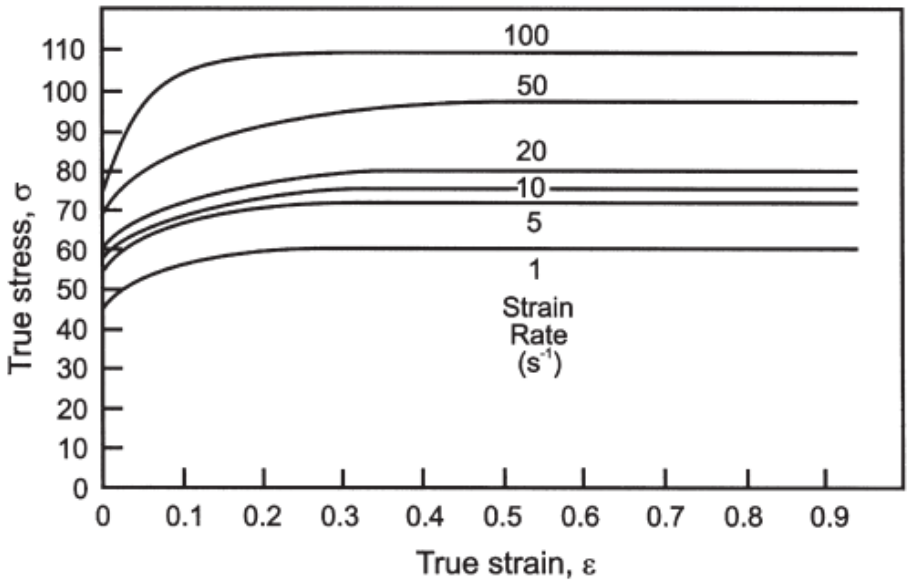
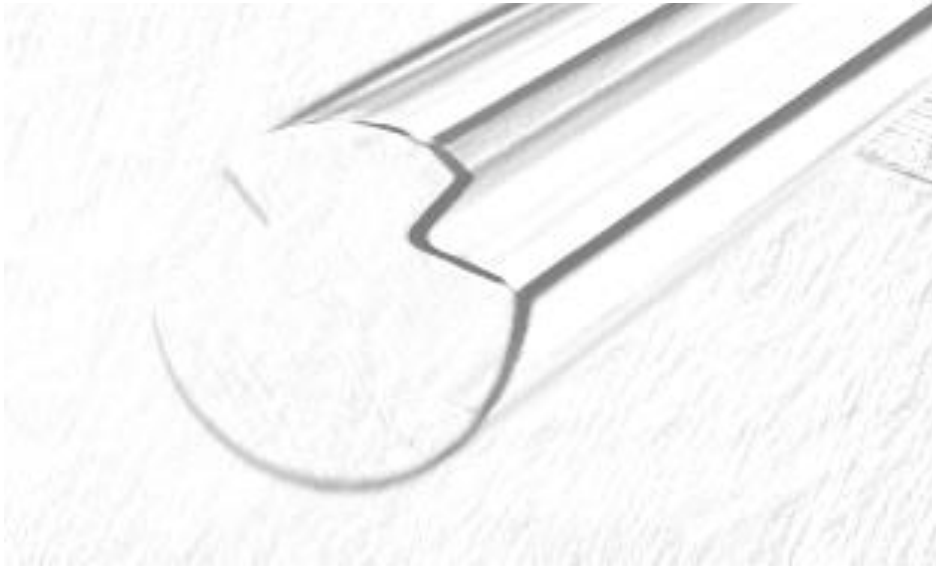
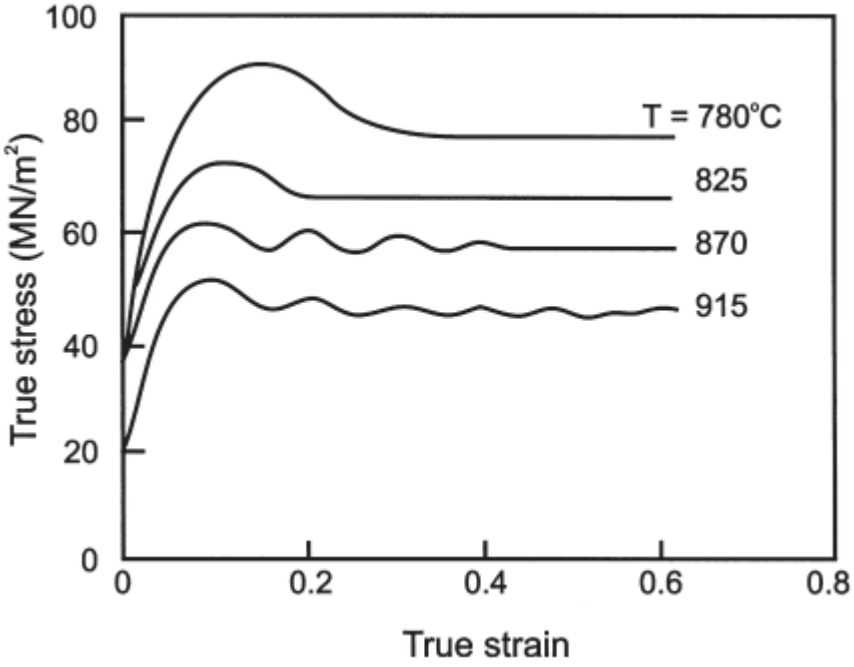
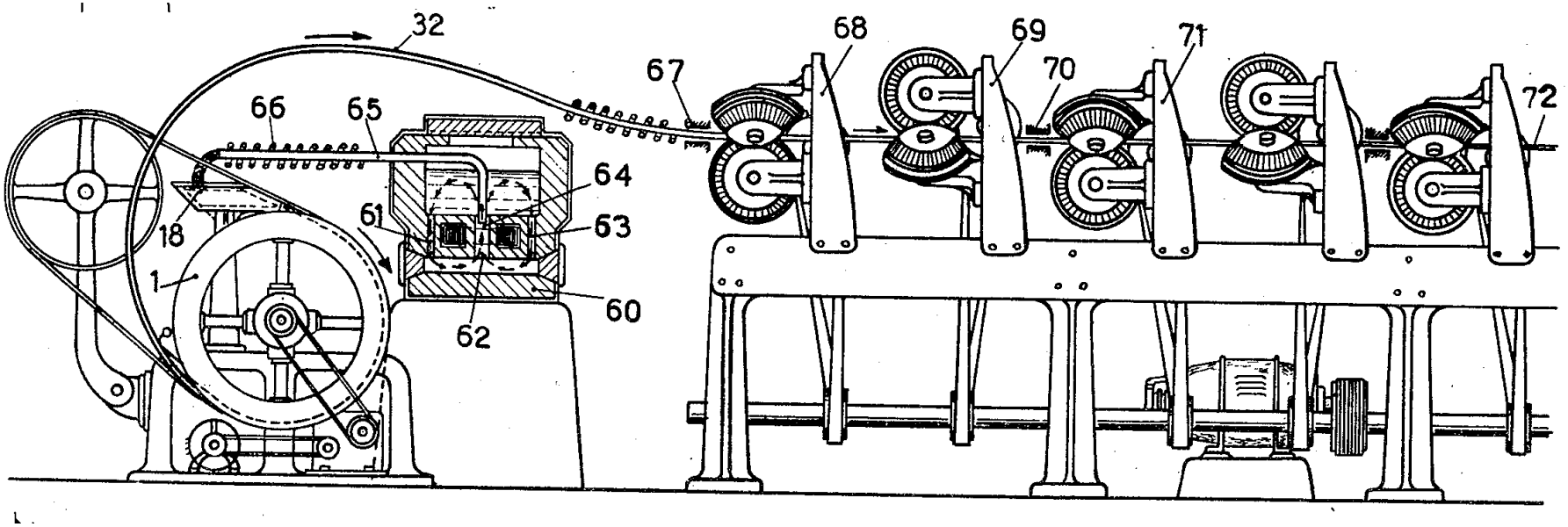


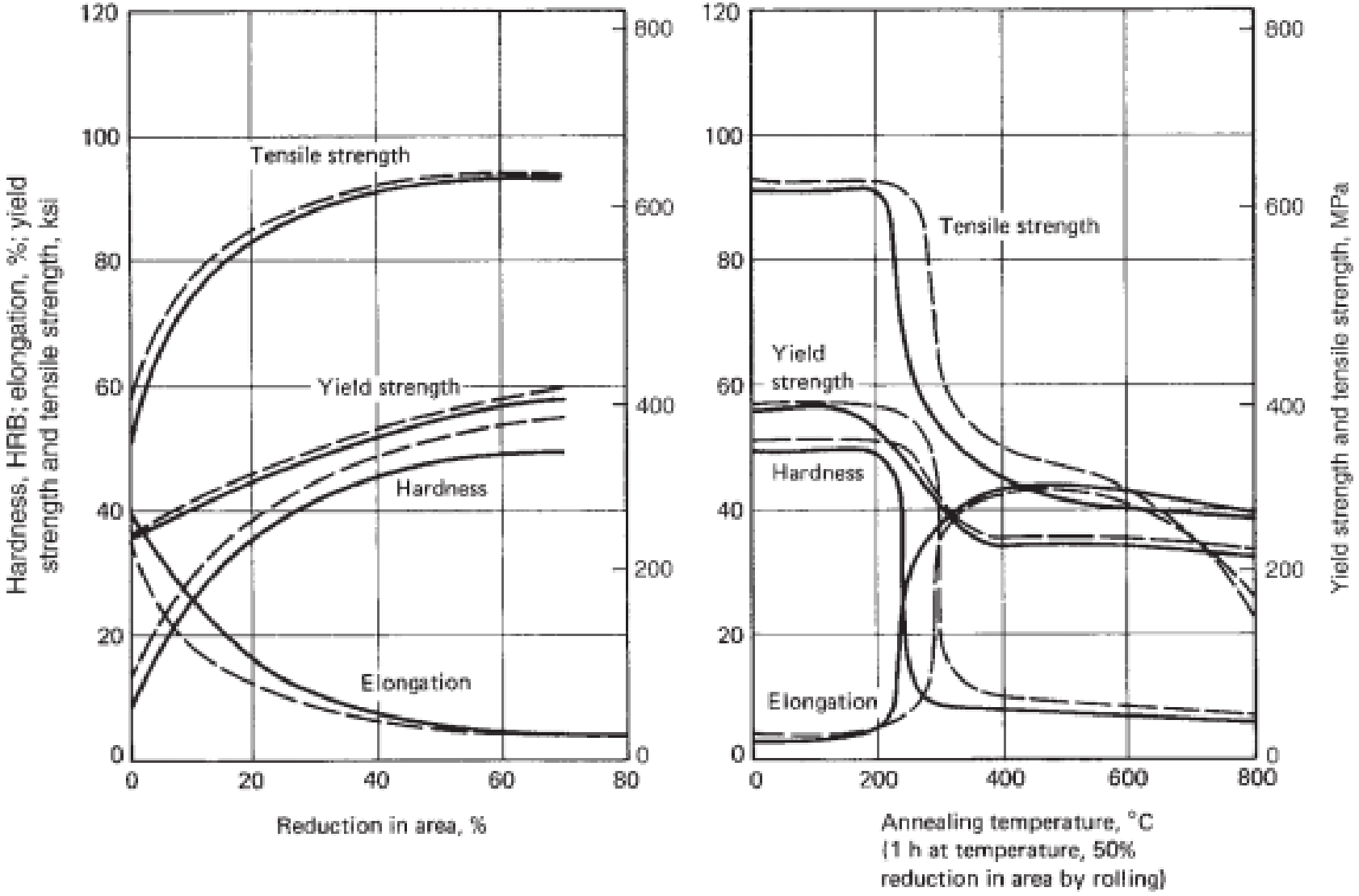
Fig.4
61
62
63
9A
11A
22A
21A
10A
12A
64
65
66
67
68

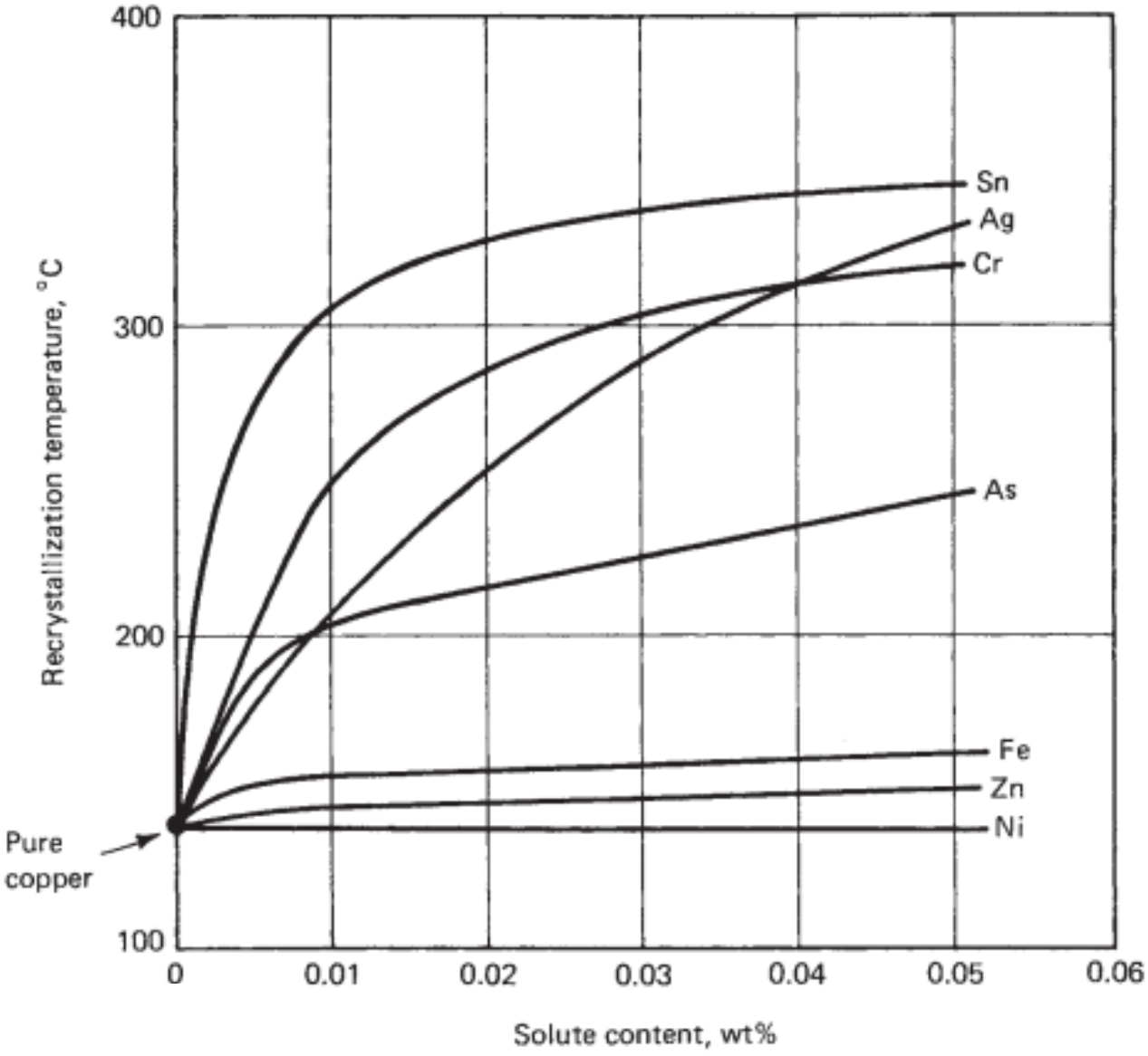

True stress, σ
True strain, ε
100
50
20
10
5
1
Strain Rate (s⁻¹)



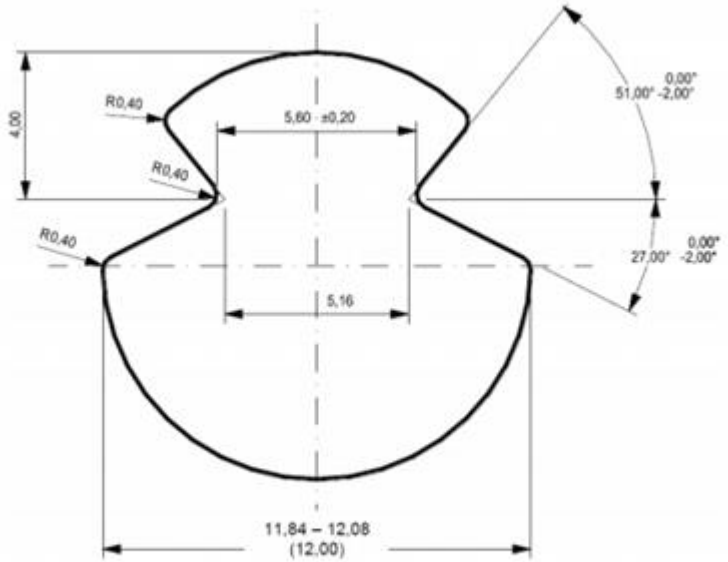

True stress (MN/m²)
True strain
T = 780°C
825
870
915


32
66
65
67
68
69
70
71
72
64
61
63
18
1
60
62


Hardness, HRB; elongation, %; yield strength and tensile strength, ksi
Tensile strength
Yield strength
Hardness
Elongation
Reduction in area, %
Yield strength and tensile strength, MPa
Annealing temperature, °C
(1 h at temperature, 50% reduction in area by rolling)


400
300
200
100
Recrystallization temperature, °C
Sn
Ag
Cr
As
Fe
Zn
Ni
Pure
copper
0
0.01
0.02
0.03
0.04
0.05
0.06
Solute content, wt%

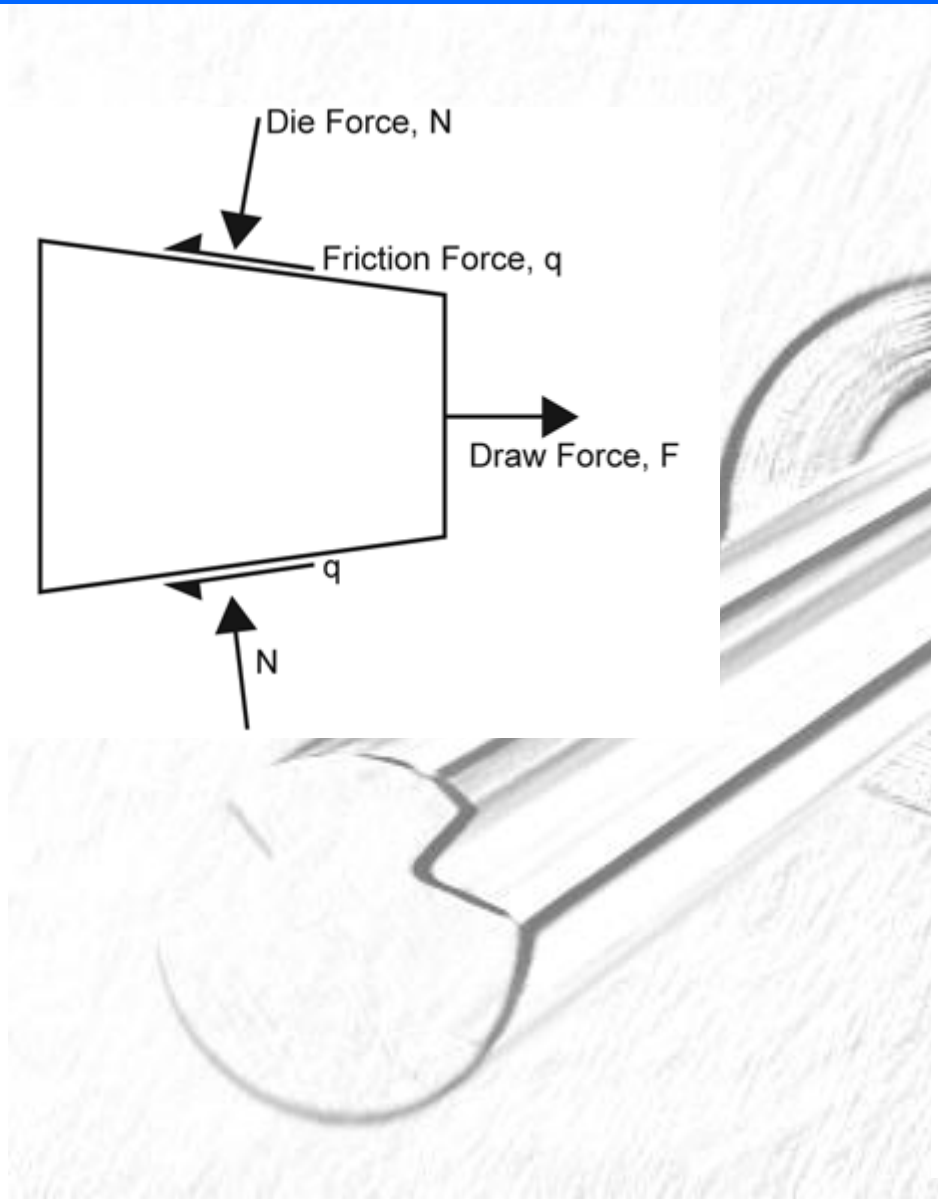
Dimensions in millimetres

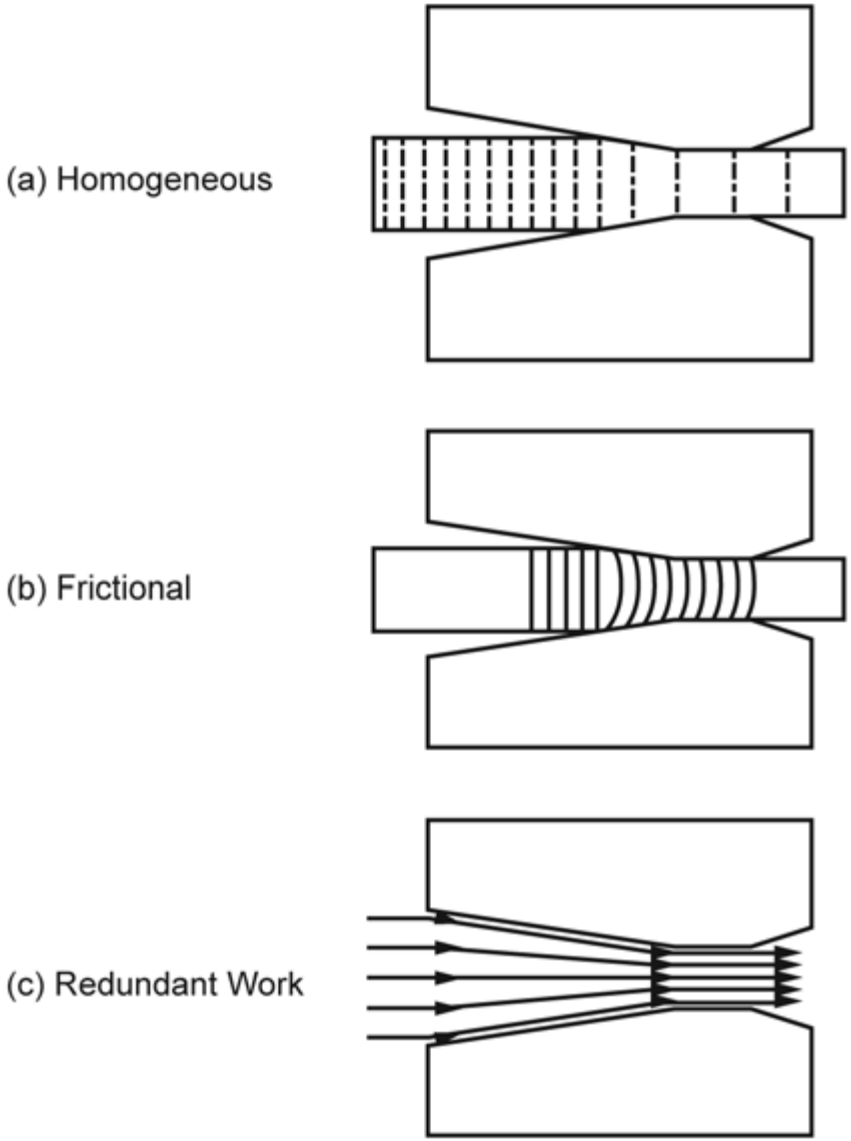


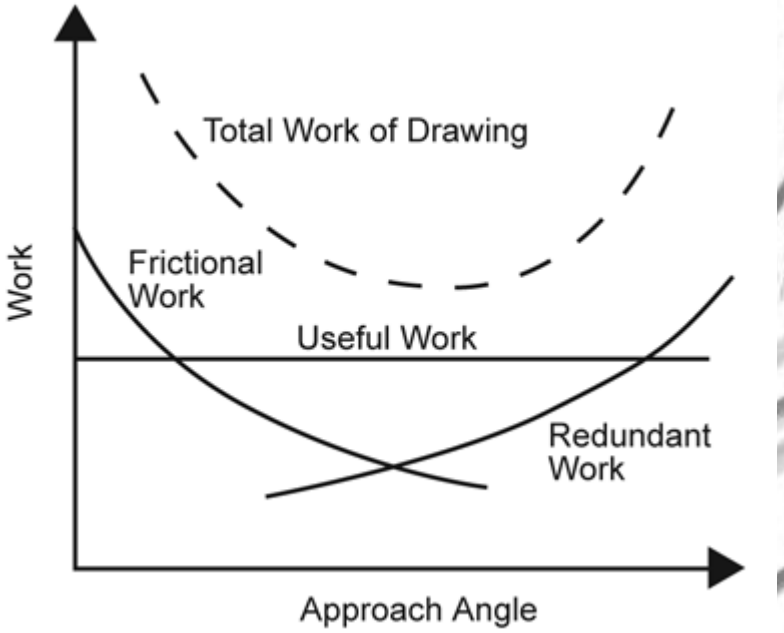
NOTE Dimensions given without tolerances or ranges are for guidance only. Dimensions in brackets are nominal only.

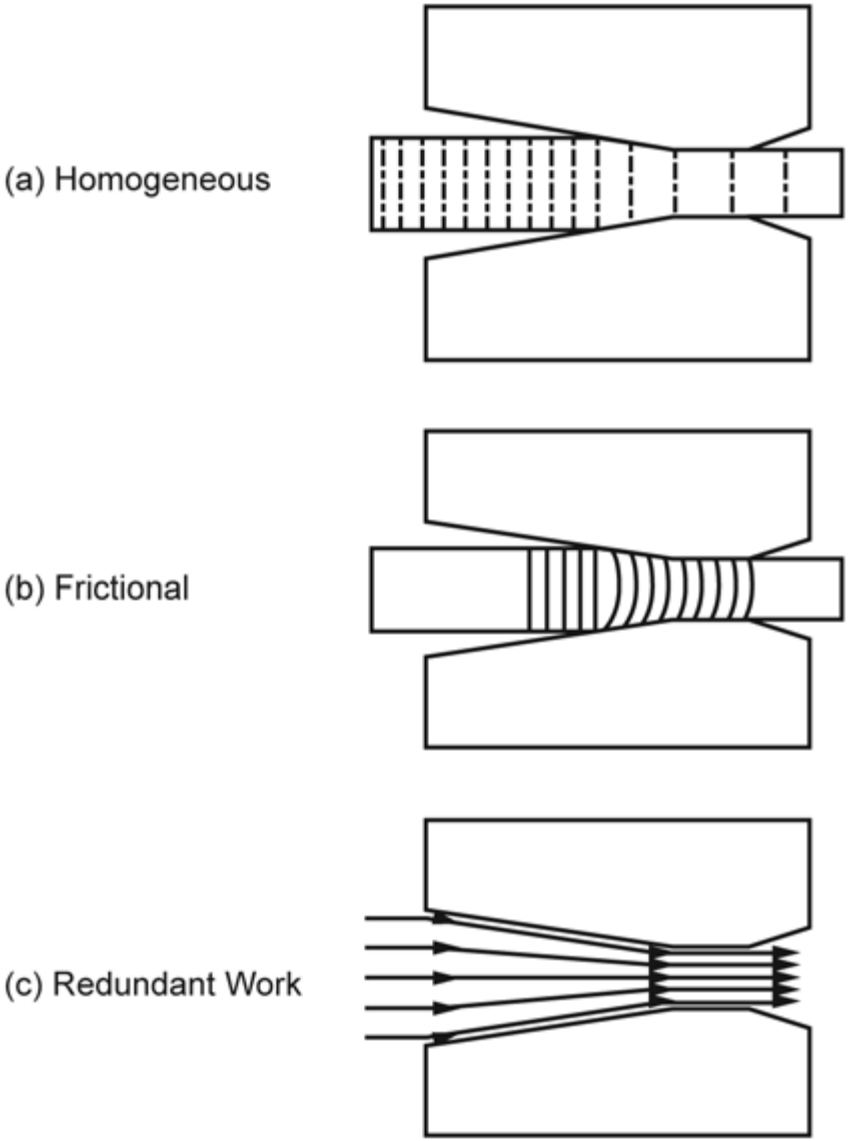
Figure A.2 - Configuration of AC-100 contact wire

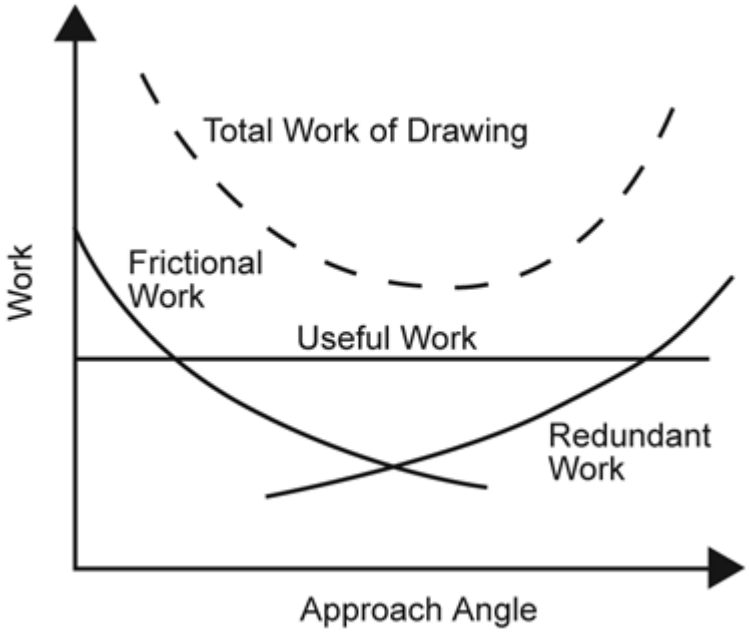
Die Force, N
Friction Force, q
Draw Force, F
q
N

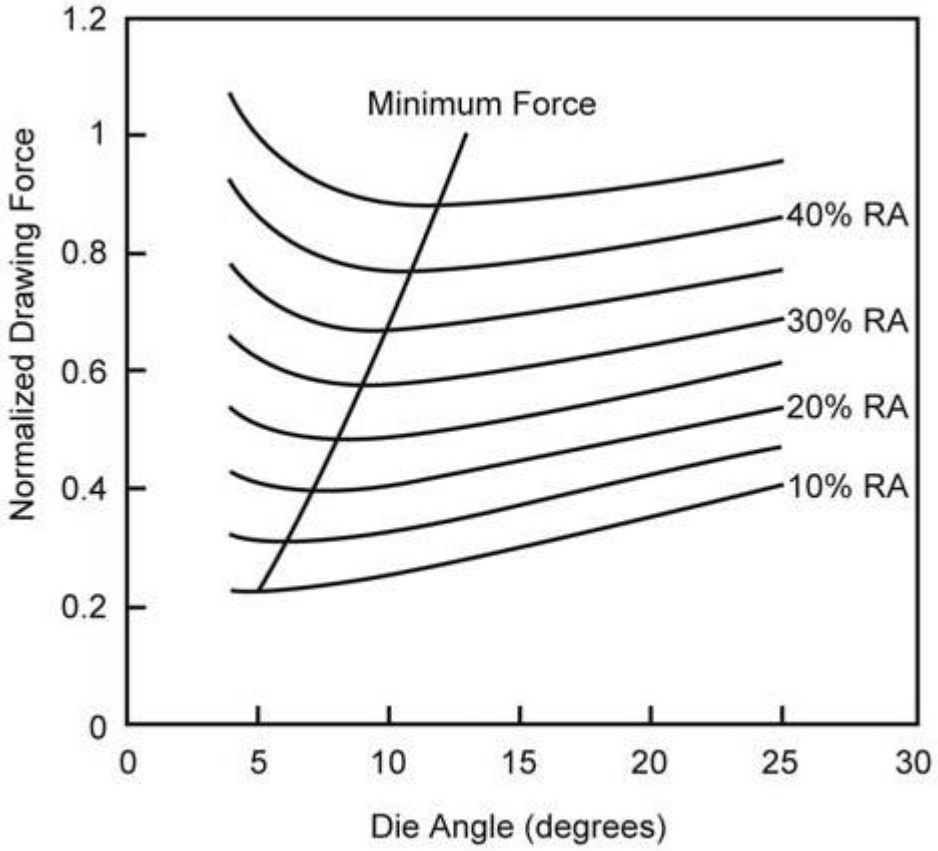


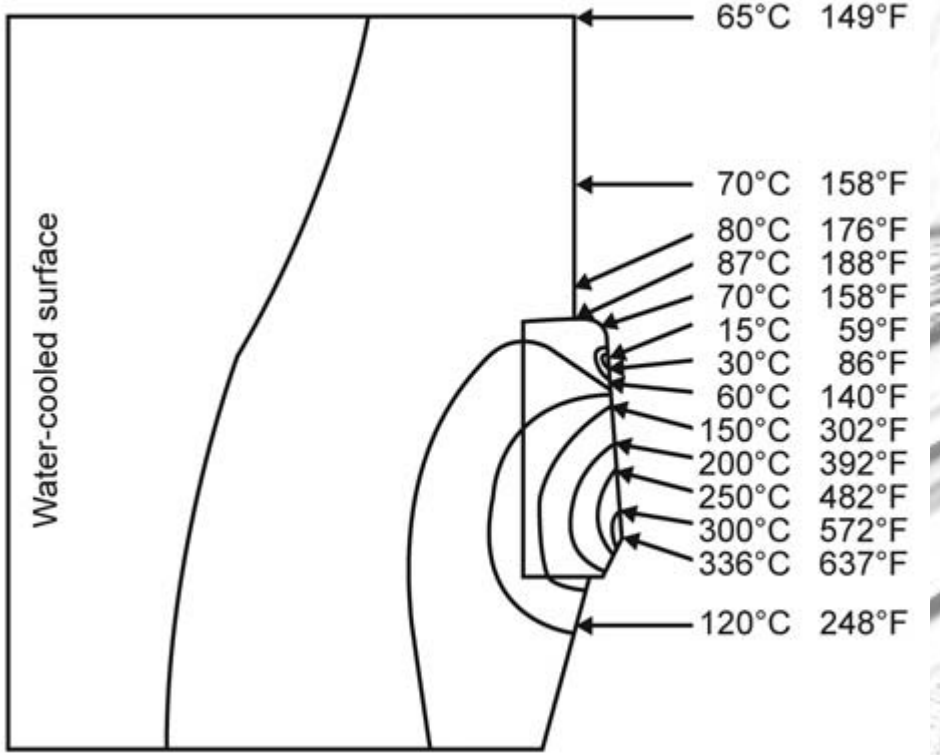

(a) Homogeneous
(b) Frictional
(c) Redundant Work

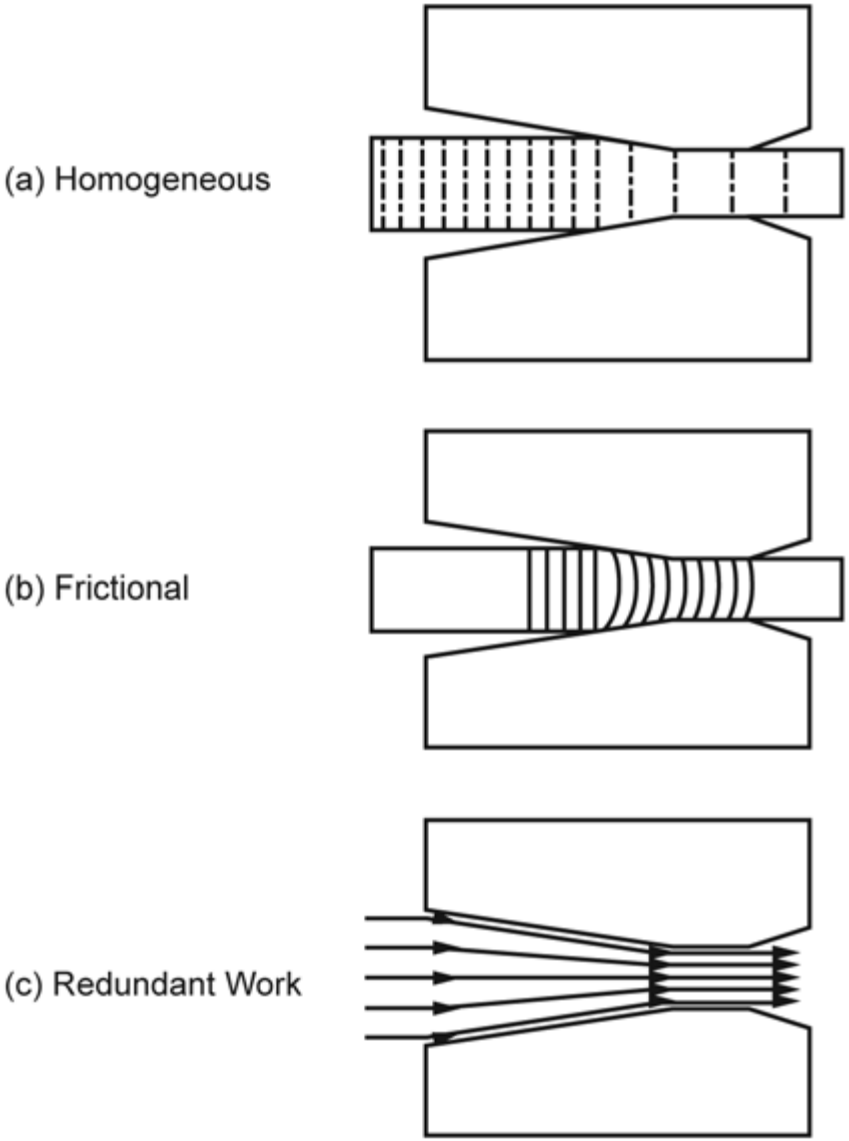

Work
Total Work of Drawing
Frictional Work
Useful Work
Redundant Work
Approach Angle

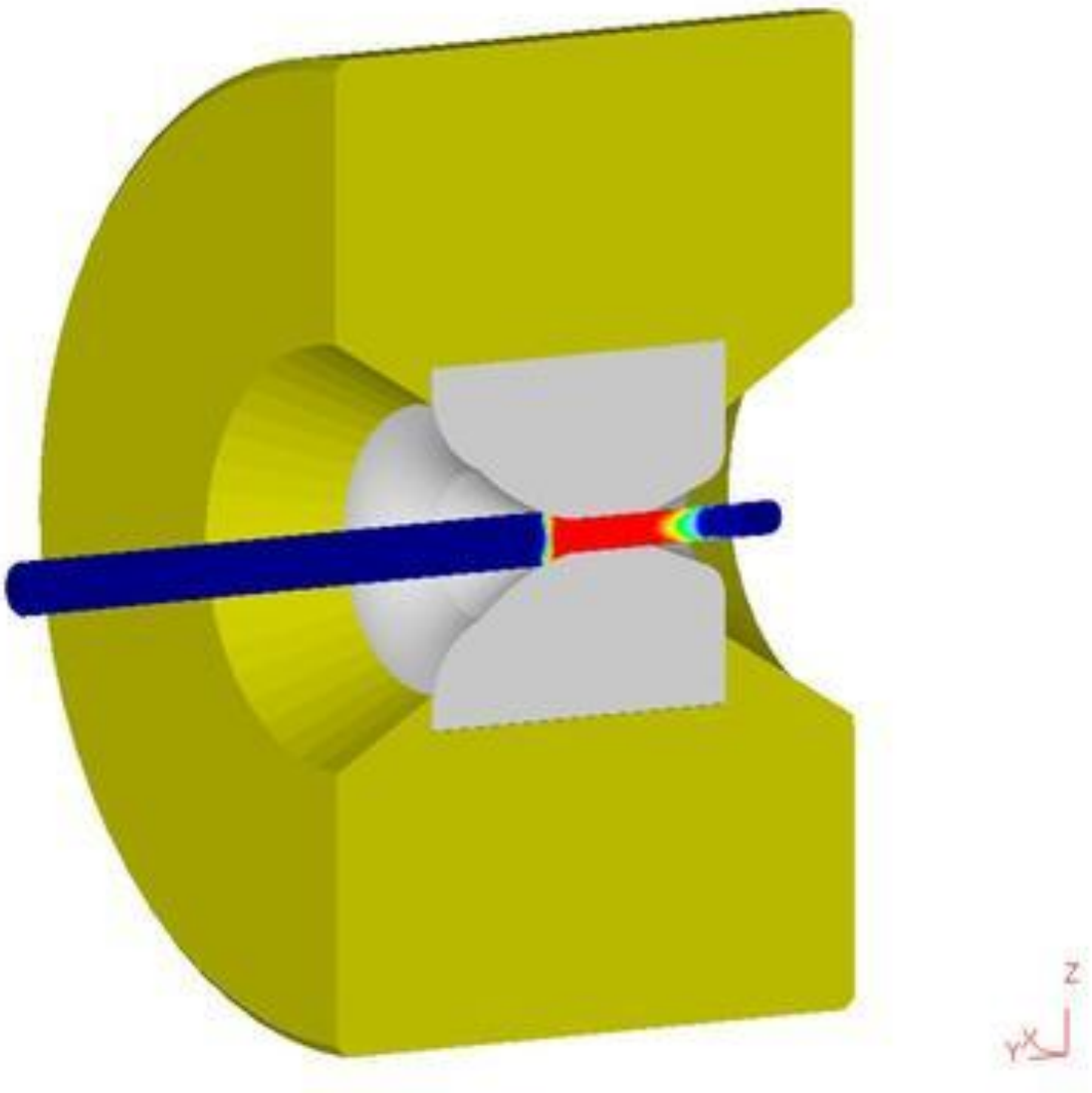

(a) Homogeneous
(b) Frictional
(c) Redundant Work

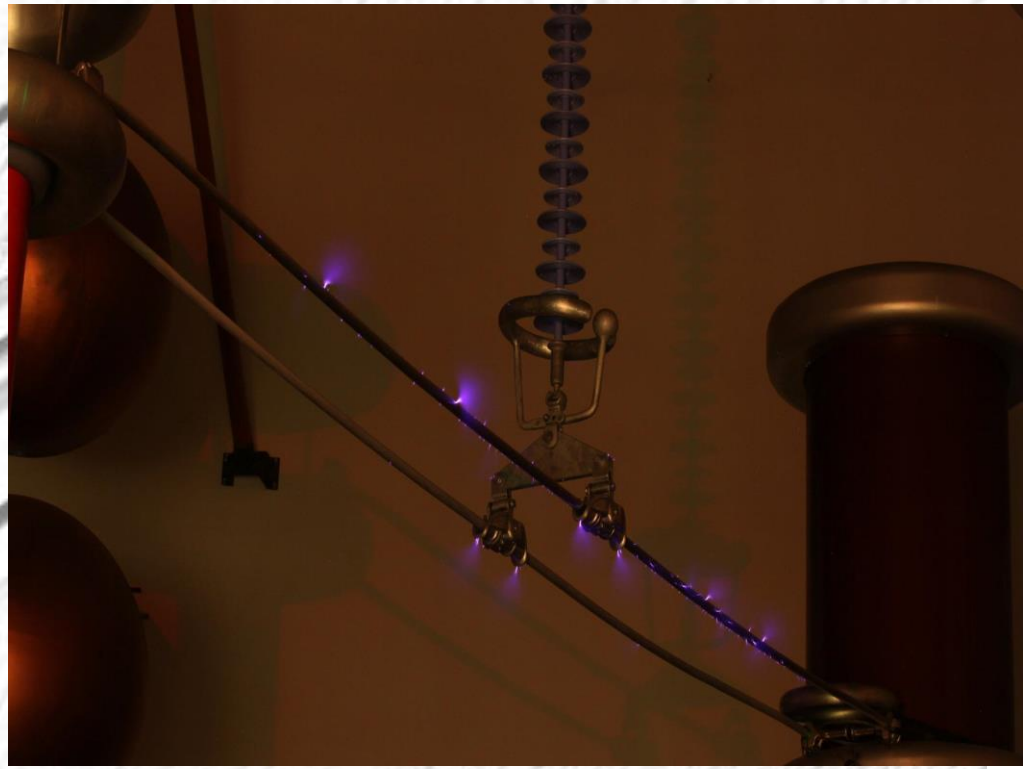

Work
Total Work of Drawing
Frictional Work
Useful Work
Redundant Work
Approach Angle


Normalized Drawing Force
1.2
1
0.8
0.6
0.4
0.2
0
Minimum Force
40% RA
30% RA
20% RA
10% RA
0
5
10
15
20
25
30
Die Angle (degrees)

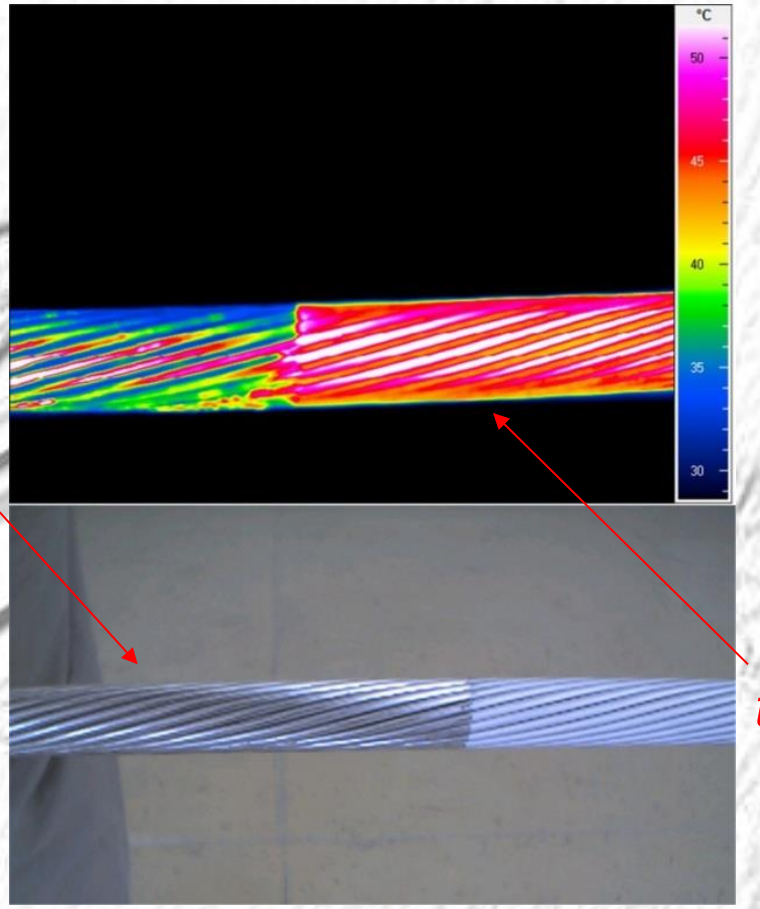

Water-cooled surface
65°C 149°F
70°C 158°F
80°C 176°F
87°C 188°F
70°C 158°F
15°C 59°F
30°C 86°F
60°C 140°F
150°C 302°F
200°C 392°F
250°C 482°F
300°C 572°F
336°C 637°F
120°C 248°F


(a) Homogeneous
(b) Frictional
(c) Redundant Work


Z
Y
X



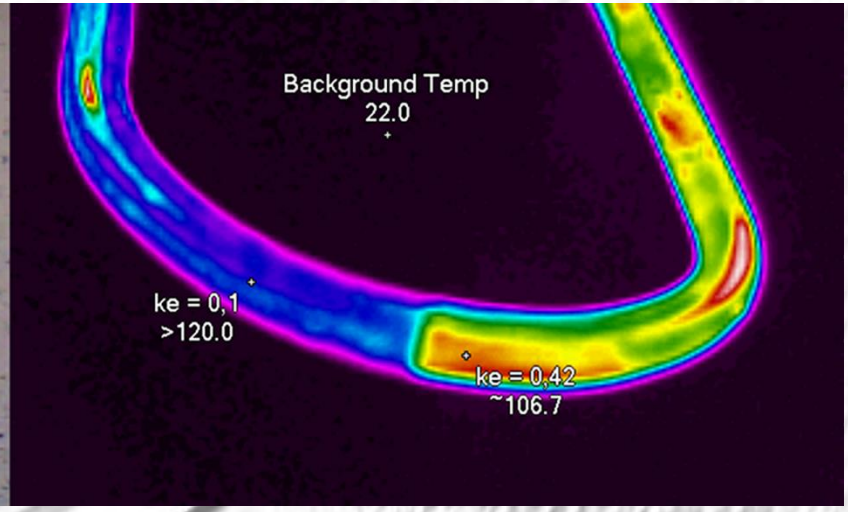
normal



treated

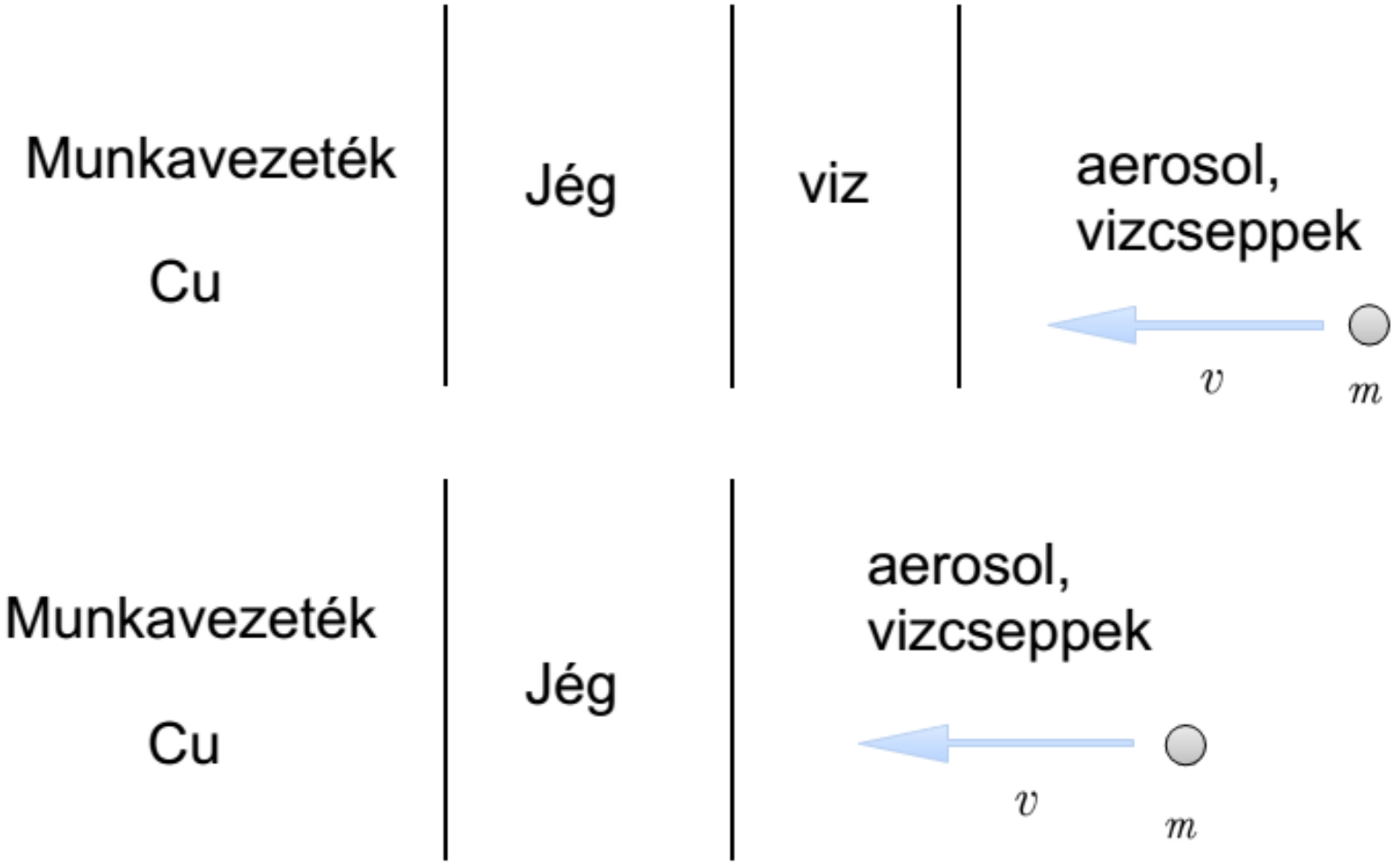
A felület emissziója 0.2-ről 0.8 értékre növelhető


Background Temp
22.0
ke = 0,1
>120.0
ke = 0,42
~106.7


Background Temp
22.0
ke = 0,1
>120.0
ke = 0,42
~106.7

ε ~0.5

ε ~0.1


Munkavezeték
Cu
Jég
viz
aerosol,
vizcseppek
v
m
Munkavezeték
Cu
Jég
aerosol,
vizcseppek
v
m

Munkavezeték

Cu

Jég

viz

aerosol,
vizcseppek

v m

$$\rho_{Cu} C_{cu} \frac{\partial T}{\partial t} = k_{Cu} \frac{\partial^2 T}{\partial x^2}$$

$$\rho_{jeg} C_{jeg} \frac{\partial T}{\partial t} = k_{jeg} \frac{\partial^2 T}{\partial x^2}$$

$$\rho_{viz} C_{viz} \frac{\partial T}{\partial t} = k_{viz} \frac{\partial^2 T}{\partial x^2}$$

$$k_{cu} \frac{\partial T}{\partial x} = H_{Cu/jeg}(T_{jeg} - T_{Cu})$$

$$k_{jeg} \frac{\partial T}{\partial x} = H_{Cu/jeg}(T_{jeg} - T_{Cu})$$

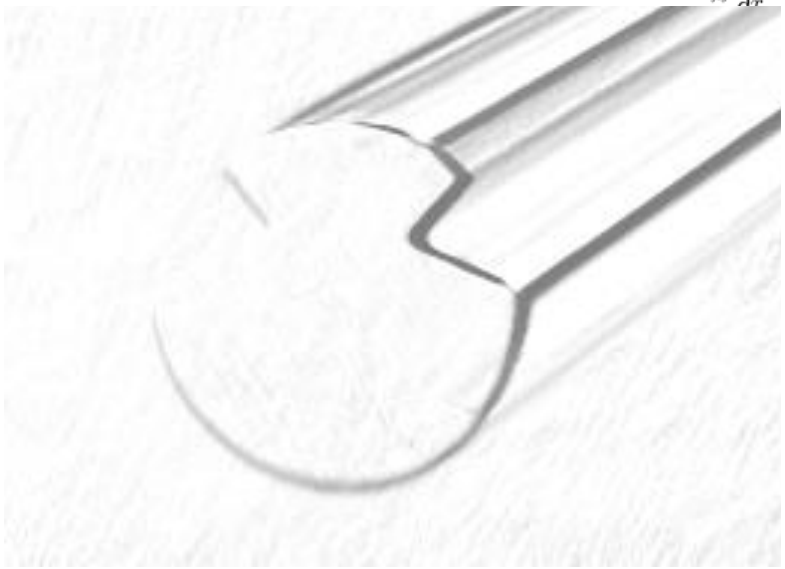
$$k_{jeg} \frac{\partial T}{\partial x} = H_{viz/jeg}(T_{jeg} - T_{viz}) + \overline{m} L$$

$$k_{viz} \frac{\partial T}{\partial x} = H_{viz/jeg}(T_{jeg} - T_{viz}) + \overline{m} L$$

$$Q_{as} = \frac{1}{2} \overline{m} v^2 + \frac{r H_{viz/levego} v^2}{2 C_{levego}}$$

$$Q_{viz} = (\overline{m} C_{viz} + \lambda_s e_o + H_{levego/viz})(T_{levego} - T)$$

$$k_{jeg} \frac{\partial T}{\partial x} = Q_{as} + Q_{viz}$$



Munkavezeték

Cu

Jég

aerosol,
vizcseppek

v m

$$\rho_{Cu} C_{cu} \frac{\partial T}{\partial t} = k_{Cu} \frac{\partial^2 T}{\partial x^2}$$

$$\rho_{jeg} C_{jeg} \frac{\partial T}{\partial t} = k_{jeg} \frac{\partial^2 T}{\partial x^2}$$

$$k_{cu} \frac{\partial T}{\partial x} = H_{Cu/jeg}(T_{jeg} - T_{Cu})$$

$$k_{jeg} \frac{\partial T}{\partial x} = H_{Cu/jeg}(T_{jeg} - T_{Cu})$$

$$Q_{as} = \frac{1}{2} \overline{m} v^2 + \frac{r H_{jeg/levego} v^2}{2 C_{levego}} + \overline{m} L$$

$$Q_{jeg} = (\overline{m} C_{viz} + \lambda_s e_o + H_{levego/jeg})(T_{levego} - T)$$

$$k_{jeg} \frac{\partial T}{\partial x} = Q_{as} + Q_{jeg}$$

Munkavezeték

Cu

Jég

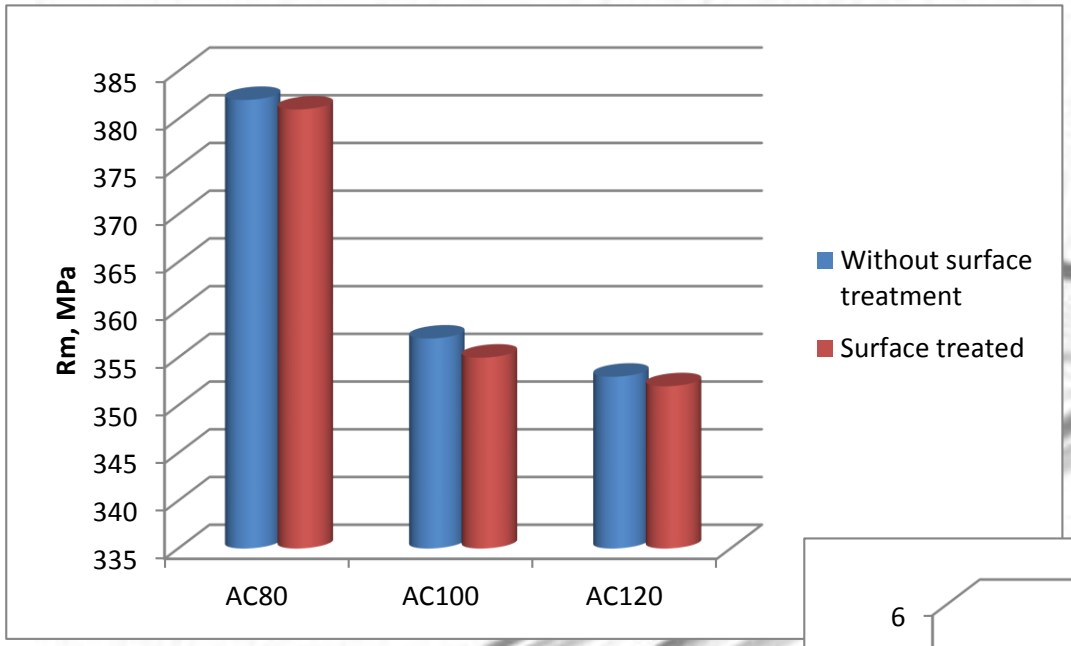
$$k_{jeg}\frac{\partial T}{\partial x} = \widehat{m}L$$

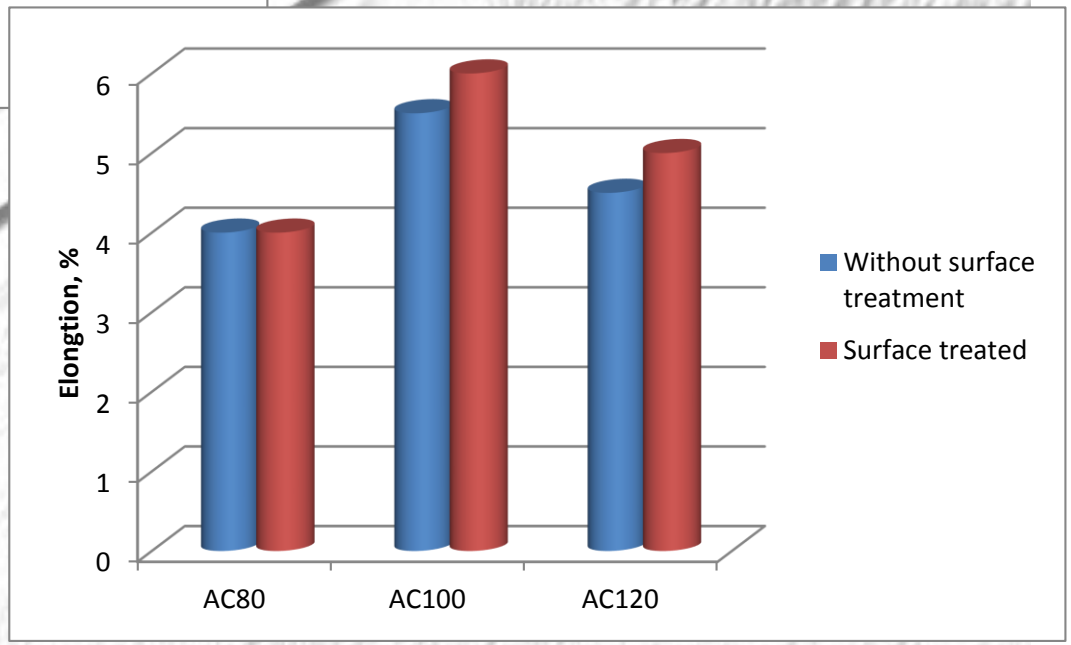
$$\rho_{Cu}C_{cu}\frac{\partial T}{\partial t} = k_{Cu}\frac{\partial^2 T}{\partial x^2}$$

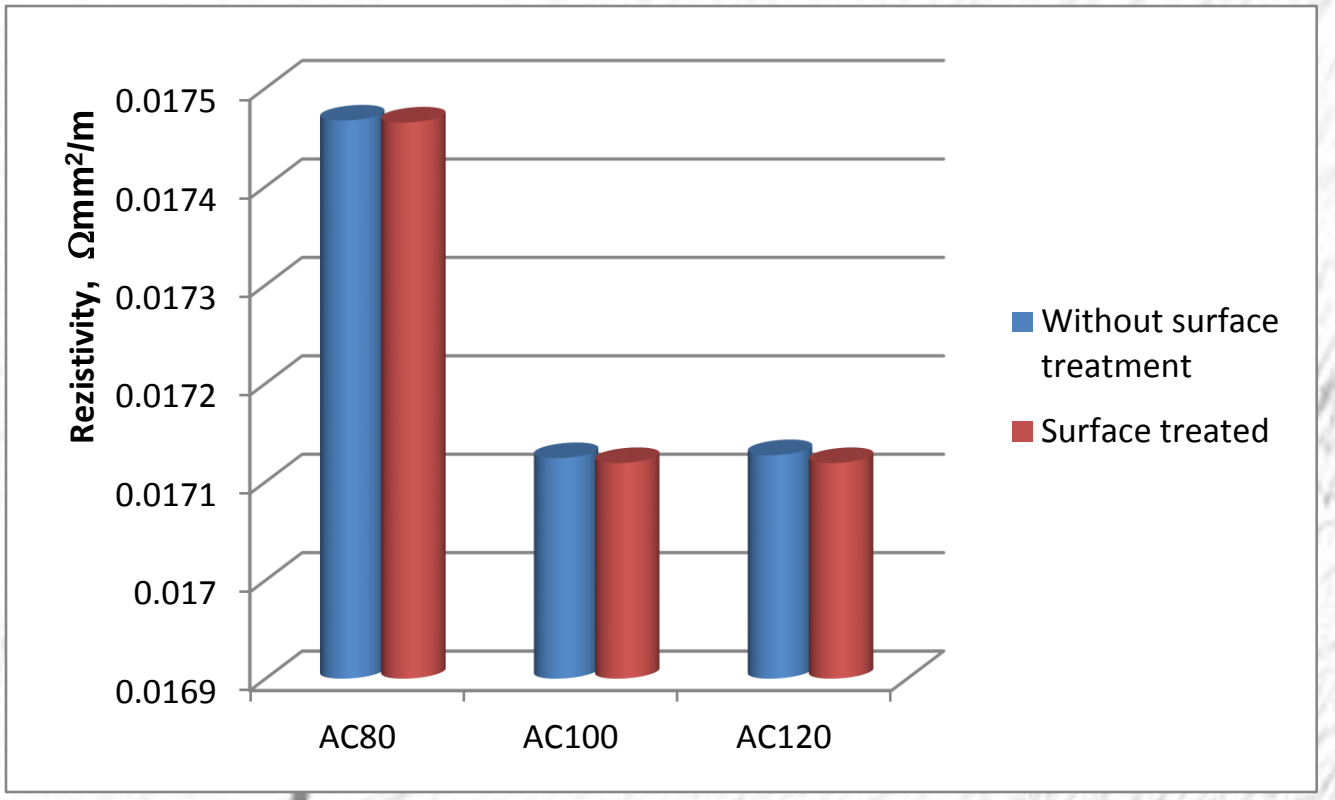
$$\rho_{jeg}C_{jeg}\frac{\partial T}{\partial t} = k_{jeg}\frac{\partial^2 T}{\partial x^2}$$

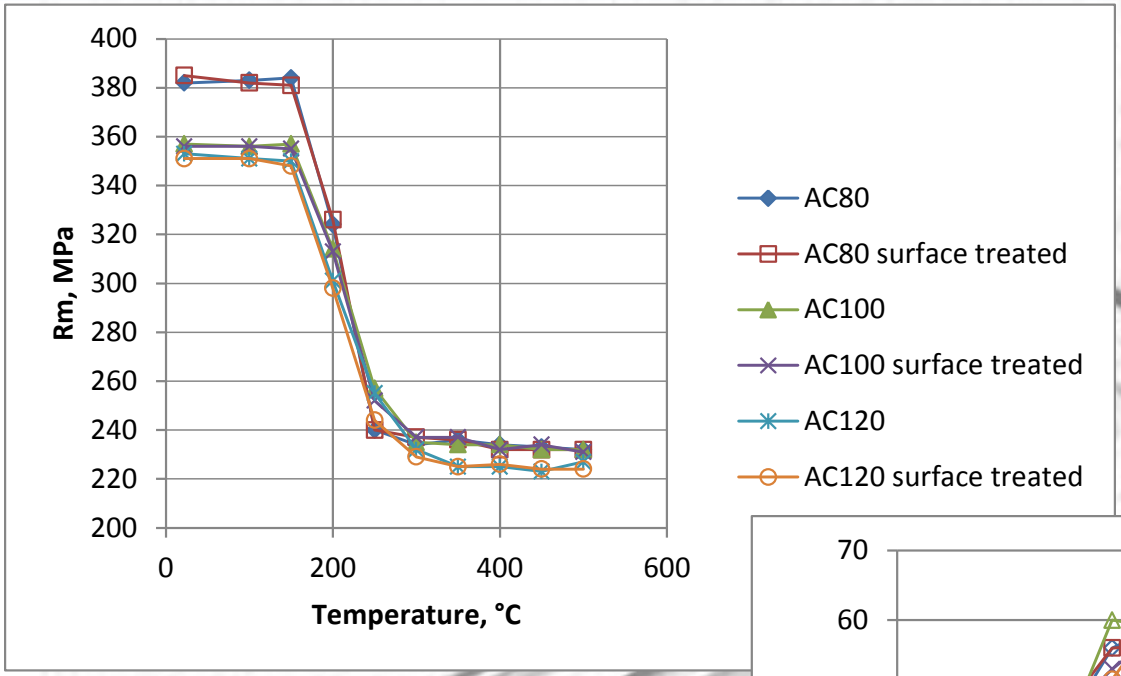
$$k_{cu}\frac{\partial T}{\partial x} = H_{Cu/jeg}(T_{jeg} - T_{Cu})$$

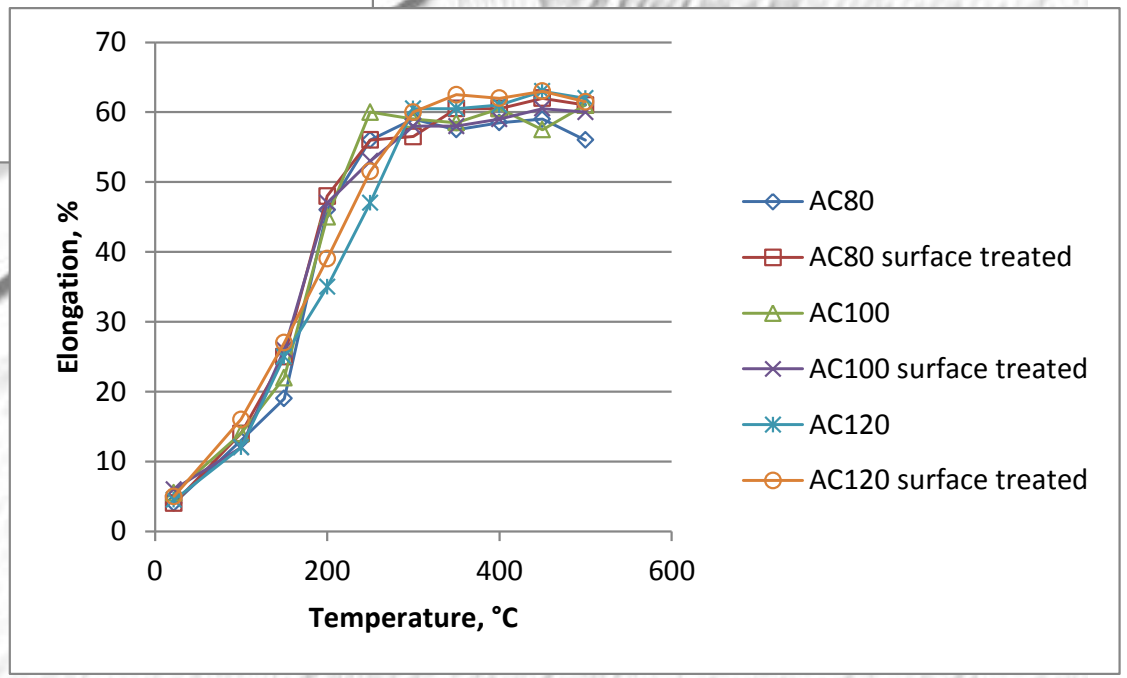
$$k_{jeg}\frac{\partial T}{\partial x} = H_{Cu/jeg}(T_{jeg} - T_{Cu})$$

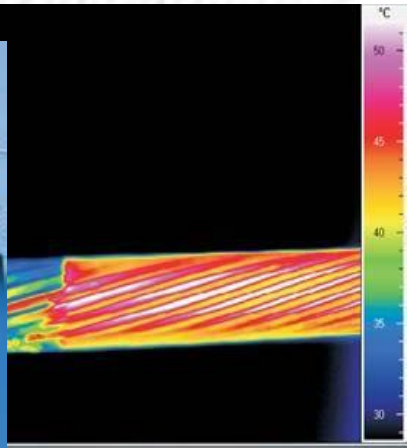

385
380
375
370
365
360
355
350
345
340
335
Rm, MPa
AC80
AC100
AC120
Without surface treatment
Surface treated


6
5
4
3
2
1
0
Elongtion, %
AC80
AC100
AC120
Without surface treatment
Surface treated


Rezistivity, Ωmm²/m
0.0175
0.0174
0.0173
0.0172
0.0171
0.017
0.0169
AC80
AC100
AC120
Without surface treatment
Surface treated


400
380
360
340
320
300
280
260
240
220
200
Rm, MPa
0
200
400
600
Temperature, °C
AC80
AC80 surface treated
AC100
AC100 surface treated
AC120
AC120 surface treated


70
60
50
40
30
20
10
0
Elongation, %
0
200
400
600
Temperature, °C
AC80
AC80 surface treated
AC100
AC100 surface treated
AC120
AC120 surface treated



FUX Zrt. 5 MISKOLCI EGYETEM ANYAGTUDOMÁNY KAR

LABORATÓRIUM

TÜV PROFI CERT

CERTIFICATE

Management system as per

EN ISO 9001:2008

Evidence of conformity with the above standard(s) has been furnished and is certified in accordance with TÜV PROFICERT procedures for

FUX Ipari, Szolgáltató és Kereskedelmi ZRt.
Vásártéri út 8.-Besenyői u. 8.
H-3527 Miskolc

scope

Production of steel ropes and slings, plastic ropes , cargo lashings, aluminium wires, bare overhead conductors and other steel strands. Production of plastic insulated high current conductors and cables, copper and bronze wires and strands, copper- and copper alloy contact wires. Production of cutted, straightened steel wire rod.

Certificate registration No. 73 100 3833
Audit Report No. 4244 0596
Valid until 2015-02-08
First certification 2012-02-09

TÜV PROFI CERT

CERTIFICATE

Management system as per

DIN EN ISO 14001:2009

Evidence of conformity with the above standard(s) has been furnished and is certified in accordance with TÜV PROFICERT procedures for

FUX Ipari, Szolgáltató és Kereskedelmi ZRt.
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Certificate registration No. 73 104 3833
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Valid until 2015-02-08
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TÜV PROFI CERT

CERTIFICATE

FUX Ipari, Szolgáltató és Kereskedelmi ZRt.
Vásártéri út 8.-Besenyői u. 8.
H-3527 Miskolc

meets the defined requirements of the TÜV PROFICERT-plus method according

BS OHSAS 18001:2007
(Occupational Health and Safety-managementsystem)

Production of steel ropes and slings, plastic ropes , cargo lashings, aluminium wires, bare overhead conductors and other steel strands. Production of plastic insulated high current conductors and cables, copper and bronze wires and strands, copper- and copper alloy contact wires. Production of cutted, straightened steel wire rod.

Certificate registration No. 70 116 3833
Audit Report No. 4244 0596
Valid until 2015-02-12
First certification 2012-02-13

Certificaat

Intermediate Statement of Verification

Certificate Number: 2191/1/H/13/INF/HUN/120475/1

contact wires

Applicant:
FUX Zrt.
Besenyői u. 8.
3527 Miskolc
Hungary

Has been assessed by:
Plunet BV
Concordiaweg 67
3551 EM Utrecht
Netherlands

Place and Date of Issue: Netherlands, Utrecht, February 11, 2013

Identification Number of Notified Body: 2191

Signature:

On behalf of Plunet BV
Name: Ir. J. Mosheuvel
Title: Manager Certification

Certificaat

Intermediate Statement of Verification

Certificate Number: 2191/1/H/13/INF/HUN/120479/1

contact wires

Applicant:
FUX Zrt.
Besenyői u. 8.
3527 Miskolc
Hungary

Has been assessed by:
Plunet BV
Concordiaweg 67
3551 EM Utrecht
Netherlands

Place and Date of Issue: Netherlands, Utrecht, February 11, 2013

Identification Number of Notified Body: 2191

Signature:

On behalf of Plunet BV
Name: Ir. J. Mosheuvel
Title: Manager Certification

ROMÂNIA
MINISTERUL TRANSPORTURILOR
AUTORITATEA FEROVIARĂ ROMÂNĂ – AFER

AGREMENT TEHNIC FEROVIAR
Seria AT nr. 347 / 2013

În baza Raportului nr. 347 din data de 08.04.2013 al comisiei de evaluare se atestă că produsul feroviar critic:

FIR DE CONTACT DIN CUPRU ŞI ALIAJE DE CUPRU
PENTRU LINIA DE CONTACT 25 kV-50Hz

furnizat de către persoana juridică:

FUX Ipari, Szolgáltató és Kereskedelmi Zártkörűen Működő

cu sediul în localitatea MISKOLC, 3527, Vásártéri, út 8, Ungaria,

ÎNDEPLINEŞTE CONDIŢIILE PENTRU UTILIZARE
ÎN DOMENIUL TRANSPORTULUI FEROVIAR

Descrierea produsului feroviar critic, condiţiile şi domeniul de utilizare sunt specificate în anexa la prezentul agrement tehnic.
Produsul feroviar critic se încadrează în clasa de risc 1A.
Prezentul agrement tehnic este valabil până la data de 07.04.2014, în următoarele condiţii: respectarea prevederilor din OMT nr. 290 / 2000 şi anexa la prezentul agrement tehnic.
Data eliberării: 08.04.2013

DIRECTOR GENERAL
Florin Dan ROPOT

Valabilitatea prezentului agrement tehnic se prelungeşte până la data de.....
În următoarele condiţii: .....
Data:

DIRECTOR GENERAL

ROMÂNIA
MINISTERUL TRANSPORTURILOR
AUTORITATEA FEROVIARĂ ROMÂNĂ – AFER

AGREMENT TEHNIC FEROVIAR
Seria AT nr. 348 / 2013

În baza Raportului nr. 348 din data de 08.04.2013 al comisiei de evaluare se atestă că produsul feroviar critic:

CONDUCTOARE MULTIFILARE DIN ALIAJE DE CUPRU (BZ II)
PENTRU LINIA DE CONTACT 25 kV-50Hz

furnizat de către persoana juridică:

FUX Ipari, Szolgáltató és Kereskedelmi Zártkörűen Működő

cu sediul în localitatea MISKOLC, 3527, Vásártéri, út 8, Ungaria,

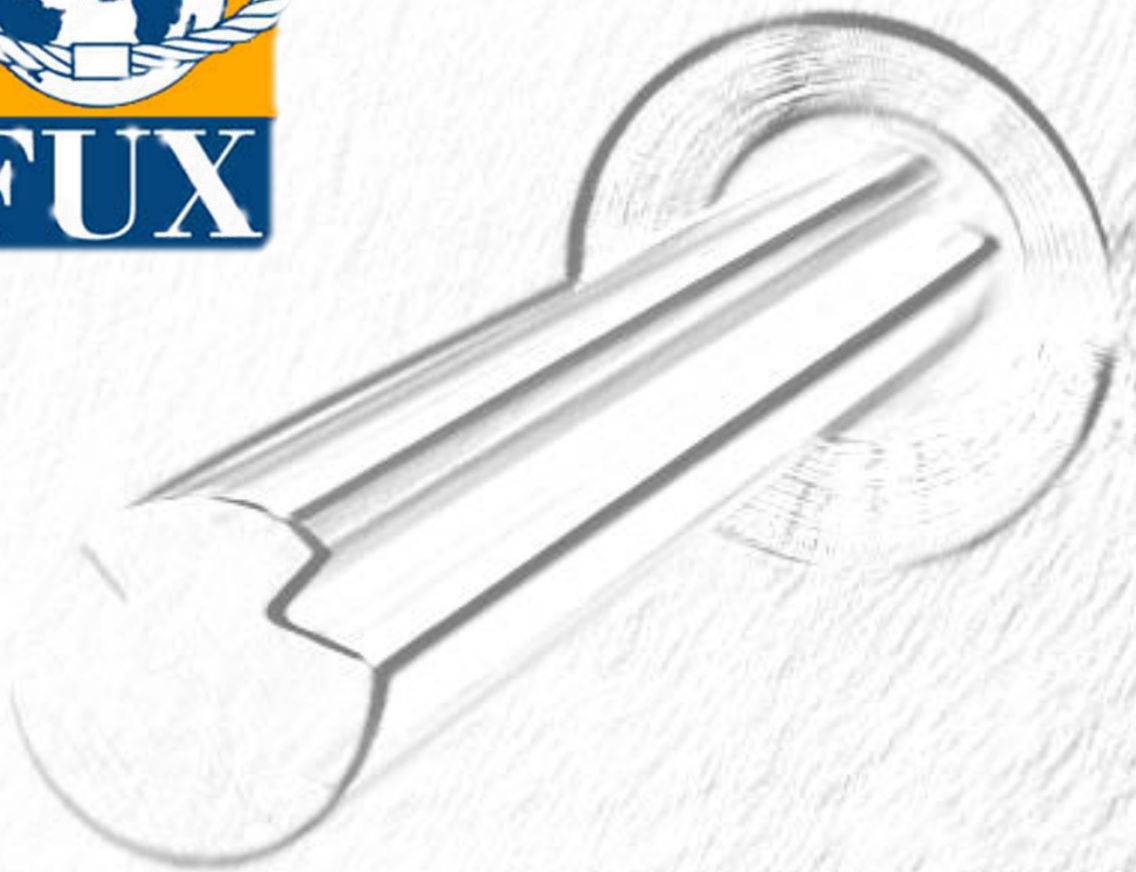
ÎNDEPLINEŞTE CONDIŢIILE PENTRU UTILIZARE
ÎN DOMENIUL TRANSPORTULUI FEROVIAR

Descrierea produsului feroviar critic, condiţiile şi domeniul de utilizare sunt specificate în anexa la prezentul agrement tehnic.
Produsul feroviar critic se încadrează în clasa de risc 1A.
Prezentul agrement tehnic este valabil până la data de 07.04.2014, în următoarele condiţii: respectarea prevederilor din OMT nr. 290 / 2000 şi anexa la prezentul agrement tehnic.
Data eliberării: 08.04.2013

DIRECTOR GENERAL
Florin Dan ROPOT

Valabilitatea prezentului agrement tehnic se prelungeşte până la data de.....
În următoarele condiţii: .....
Data:

DIRECTOR GENERAL



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