



# Medium Voltage Range



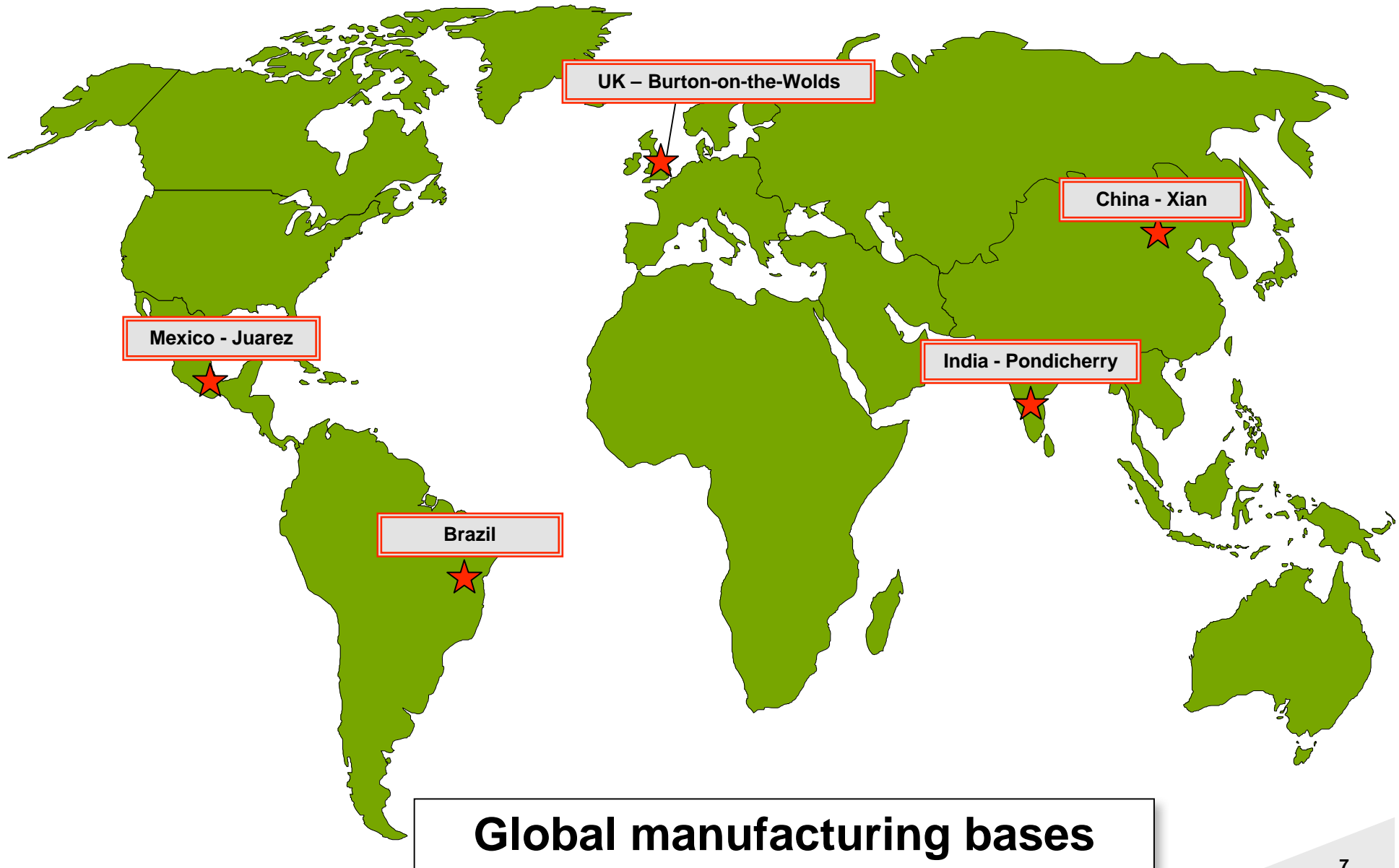
**COOPER** Bussmann



- **Overhead line products (HVO)**
  - **Non current limiting fuses**
    - **Expulsion fuse-links**
    - **Liquid filled fuse-links**
    - **Automatic sectionalising links (ASL's)**
    - **Distribution cut-outs**
  
- **Current limiting fuse-links (HVP)**
  - **Powder filled fuses**

**Complete range of medium voltage fuse products**

# Medium Voltage Manufacturing Locations



- **Expulsion fuse-links**
- **Expulsion fuse cut-outs**
- **Liquid filled fuse-links**
- **Automatic sectionalising links (ASLs)**
- **Boric acid fuse-mounts**
- **Boric acid fuse-links**



**Extensive range of overhead line products**

➤ **Product Range**

- 2.75kV to 72.5kV
- 0.5 amps to 450 amps
- DIN, BS or ANSI rated
- Full range, back up and general purpose
- Variety of terminations, end caps



➤ **Applications**

- Fuses for oil-filled switchgear, air insulated switchgear, SF6 switchgear, indoor and outdoor
- Fuses for transformer, motor, voltage transformer and capacitor protection

**Fuses for a wide range of applications**

- **Manufacture 300K fuses per year**
- **Approximately 40% to DIN standard**
- **Designs first produced in the late 1950's**
- **Manufactured over 6 million fuses**
- **Global sales to over 100 countries worldwide**



**The world's leading manufacturer**





*Introducing –*  
**The NEW MV DIN T Range**

January, 2008



**COOPER** Bussmann



- Brand new MV DIN range from Cooper Bussmann
- Covers 12, 17.5 and 24 kV
- Developed over three years
- Utilises Cooper Bussmann® **M-effect technology** for low power loss
- Compliant with IEC 60282-1 (2005), DIN 43625 and global utility standards
- Formally certified at KEMA  Holland, in 2006/2007
- Lead and cadmium free (complying with RoHS and WEE directives)
- Fully recyclable 
- Suitable for both indoor and outdoor applications
- Fitted with a new 80NM sealed, spring striker

**Most advanced MV DIN range available**



# 12FDLSJ10

| kV            | 1    | 2                    | 3 | 4       | 5   | Amps |
|---------------|------|----------------------|---|---------|-----|------|
| 12            | F    | D                    | L | S       | J   | 10   |
| Rated Voltage | Type | Barrel Dia. & Length |   | Striker | Tag |      |

**Intelligent part numbering system - easy identification in the field**

# MV DIN Current Limiting Fuses

- **Existing range** from 3.6kV up to 36kV, 3.15A up to 200A
- **New T range** covers 12, 17.5, 24 kV
- Fuse comes with 80NM sealed striker ('E' type in fuse reference)
- Four standard lengths
  - 192mm 3.6kV (3.6ADOSJ6.3)
  - 292mm 7.2, 12, 17.5kV (12TDLEJ31.5) - *NEW*
  - 442mm 12, 17.5, 24kV (24TDMEJ40) - *NEW*
  - 537mm 36kV (36TDQSJ25)
- As current rises, body diameter increases, 4 body sizes
  - 51mm (2") 12TDLEJ40
  - 67mm (2.5") 12THMEJ - *NEW*
  - 76mm (3") 12TFMEJ125
  - 88mm (3.5") 12TXLEJ160

**Complete MV DIN range**

# Fuse-Links Bases For Mounting

## ➤ 12/24kV Medium Voltage DIN Fuse Bases

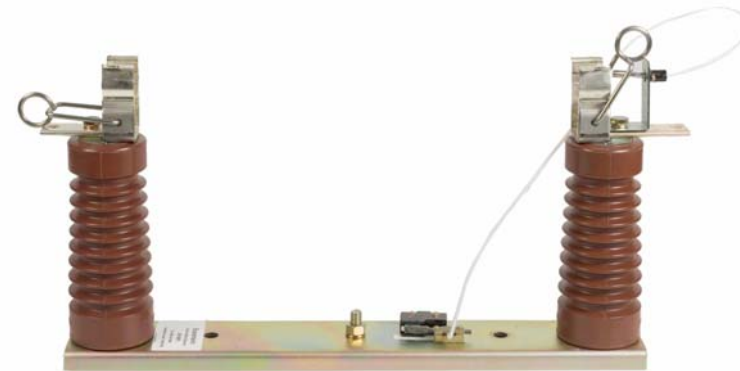
- Suitable for outdoor fuse mounting
- Optional moving and fixed contacts
- complete with or without micro-switch

## ➤ Ratings

- Volts: 12kV – 24kV
- Amps: 6.3A – 200A

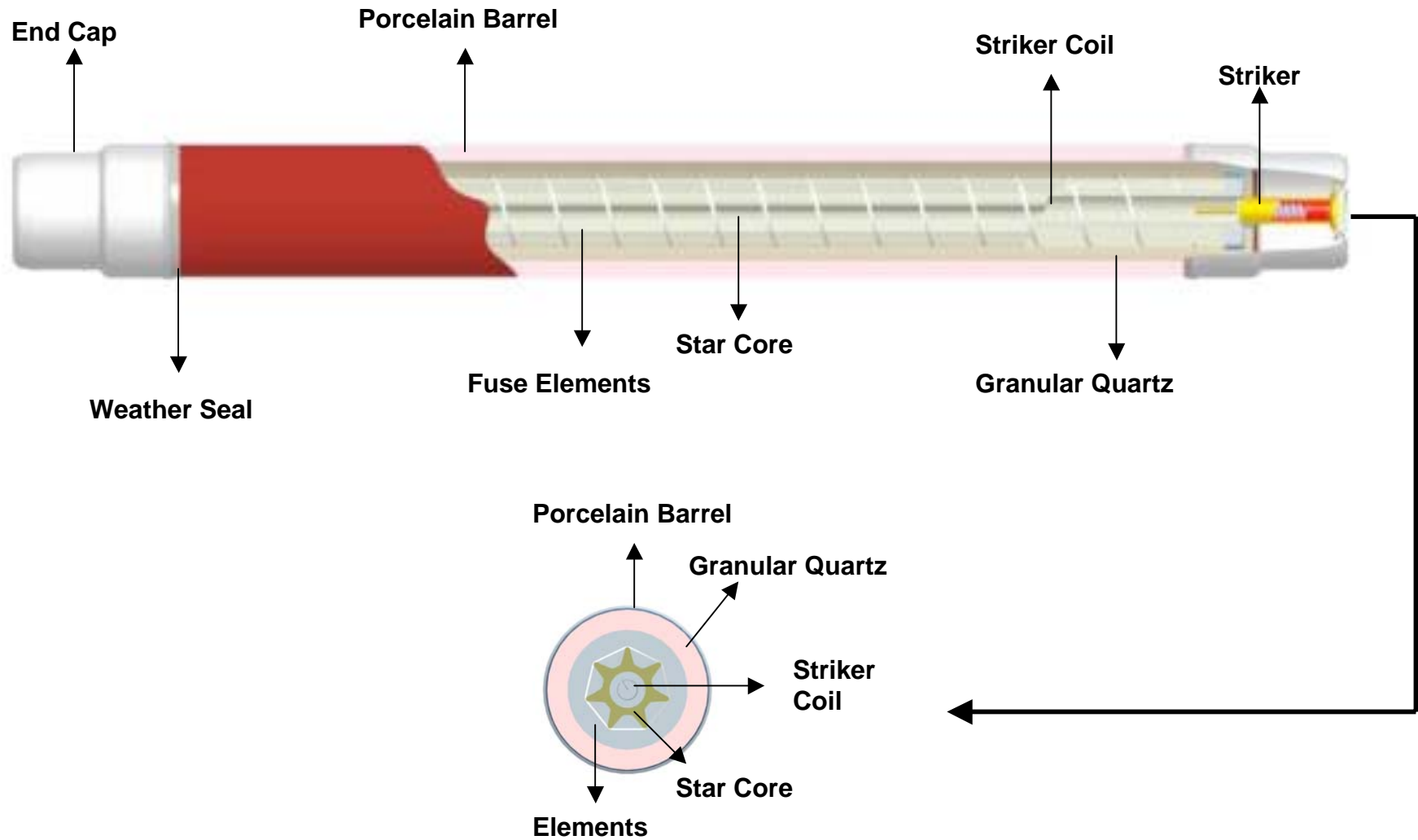
## ➤ Agency Information

- Comply with DIN Dimensional standard DIN 43624, VDE 0670 part 4 and with IEC 60282-1 (2005)
- Suitable for indoor and outdoor use



**New range of complementary DIN fuse bases**

# MV DIN Fuse Construction



# MV DIN T Range – Features and Benefits

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- **Certification:** our MV DIN range of fuses are fully tested and certified to IEC 60282-1 2005
- The use of **M-effect** drastically reduces the temperature of the fuse-link during operation → ensures maximum level of network efficiency by reducing unnecessary power loss
- **Cool running** and **low power dissipation** during normal operation in service
- **Cool operation.** The maximum temperature rise of the fuse-link is well within the temperature limits for all switchgear thanks to the M-effect → the life cycle of the substation is increased, reducing capital and maintenance costs
- **Silver elements.** All our MV fuses use 99.8% pure silver in their elements → high conductivity → low power (revenue) loss, maximising network efficiency

**Designed to increase network productivity**

# MV DIN T Range – Features and Benefits

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- Reduced nuisance operation due to surge currents
- Low arc voltage → the switchgear and cables are not unduly stressed by being exposed to high arc voltages → prolonging the life of the switchgear and improving asset utilization
- Stock holding and part numbers can be reduced: a 24kV MV DIN fuse can be used on a 12kV system → reducing costs, removing the need for an additional fuse extension equipment and so inventory
- Very mechanically robust fuse-link, all connections are welded not soldered
- Quality - All our fuses are 100% X-rayed and resistance checked during production

**Design and quality systems ensures product integrity  
and reduce ownership costs**

# MV DIN T Range – Features and Benefits

- **Element design:** Cooper Bussmann® MV DIN fuse element employ a neck or notch design → the smallest degree of accidental damage is easily detected during manufacturing test measurements



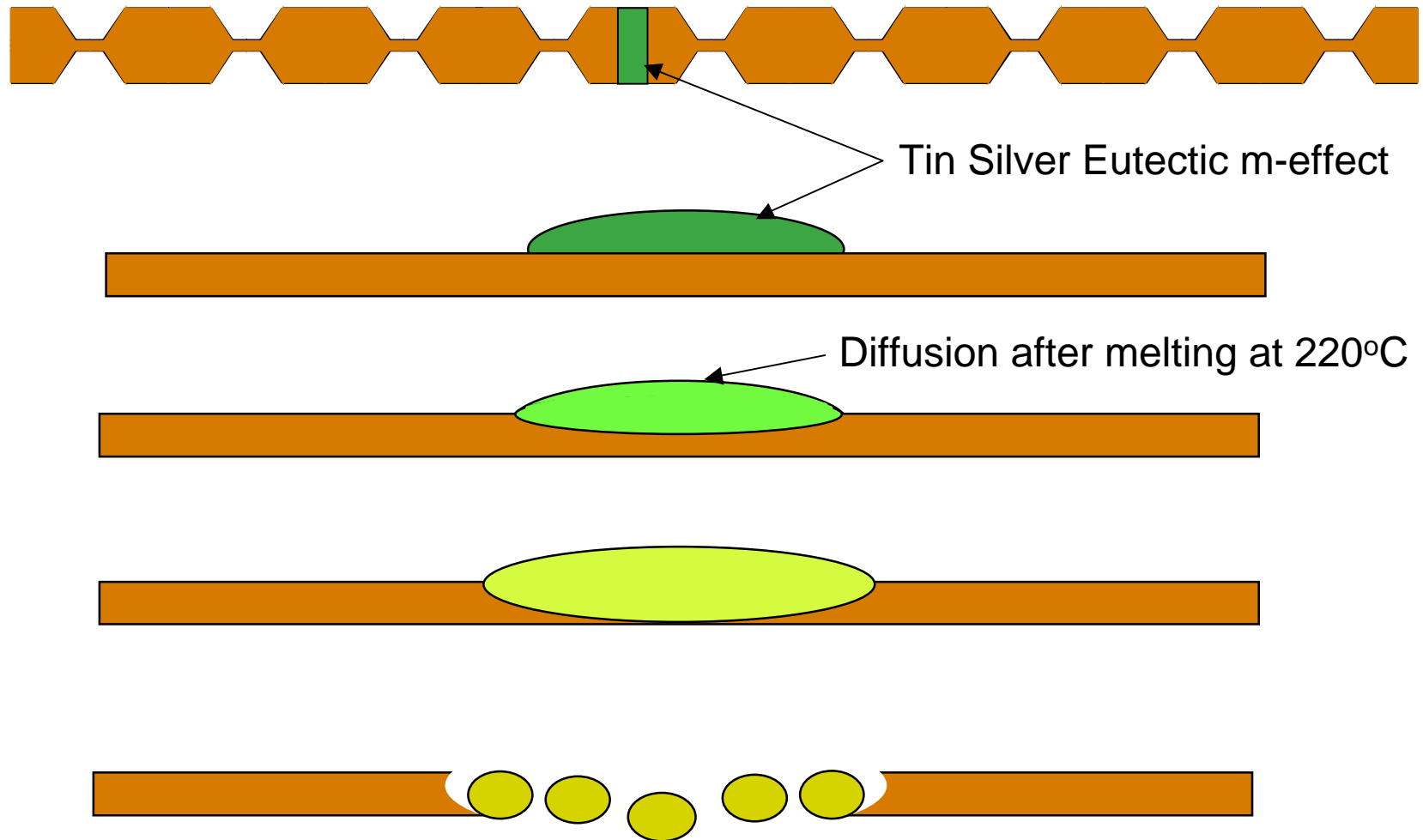
Cooper Bussmann



Other Medium Voltage  
Fuse-Links Design

- Cooper Bussmann operates a recycling scheme for all medium fuse-links

**Robust element design improves reliability**

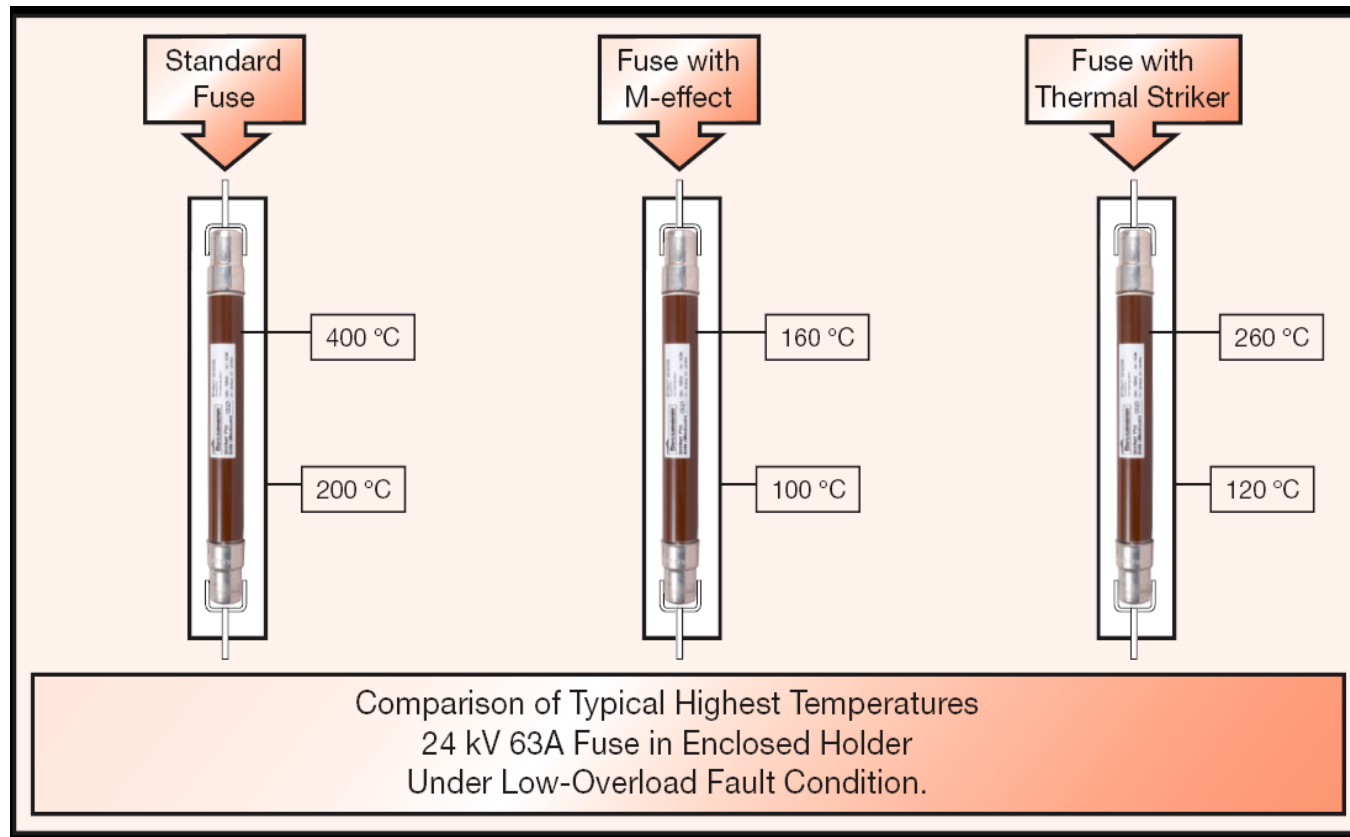




- **Tin-silver alloy ensures melting at 220°C**
- **160°C typical maximum body temperature**
- **Temperature of enclosure insulation <100°C**
- **Ensures safe operating temperatures**
- **Cooler running in normal service**
- **Lower power dissipation**
- **Less de-rating in enclosures**










**Ensures safe operation and improves system efficiency**

## Published and predicted temperatures during overload



**M-effect fuses** have lowest temperature operation minimising heating effects on surrounding switchgear insulation and fuse contacts

# Watts Loss Comparison – 12kV










|  Part Number |  Watts Loss |  Watts Loss |  Watts Loss | MESA Watts loss |  Watts Loss |  Watts Loss |  Watts Loss |  Watts Loss |  Watts Loss |
|---|--|--|--|-----------------|--|--|--|--|--|
| 12TDLEJ6.3  | 10   | 19   | 14   | 16              | 15   | 16   | 19   | 12   | 46   |
| 12TDLEJ10   | 16   | 29   | 23   | 18              | 10   | 18   | 18   | 19   | 25   |
| 12TDLEJ16   | 16   | 21   | 28   | 37              | 19   | 37   | 35   | 27   | 34   |
| 12TDLEJ20   | 18   | 25   | 23   | 42              | 23   | 42   | 36   | 28   | 38   |
| 12TDLEJ25   | 24   | 31   | 29   | 52              | 33   | 52   | 38   | 29   | 47   |
| 12TDLEJ31.5   | 28   | 39   | 38   | 59              | 46   | 59   | 41   | 36   | 41   |
| 12TDLEJ40   | 36   | 46   | 50   | 74              | 56   | 74   | 56   | 50   | 52   |
| 12TDLEJ50   | 47   | 62   | 56   | 70              | 44   | 70   | 74   | 52   | 70   |
| 12TDLEJ63   | 60   | 60   | 63   | 82              | 65   | 82   | 89   | 64   | 78   |
| 12THLEJ80   | 72   | 82   | 76   | 102             | 77   | 102  | 108  | 95   | 82   |
| 12THLEJ100  | 85   | 96   | 104  | 120             | 104  | 120  | 112  | 120  | 101  |
| 12TKLEJ125  | 93   | 117  | 159  | -               | 152  | -  | -  | -  | 125  |
| 12TXLEJ160  | 217  | 217  | 173  | -               | 200  | -  | -  | -  | -  |
| 12TXLEJ200  | 333  | 333  | 292*   | -               | -  | -  | -  | -  | -  |

\* derating factor apply

- New 12kV DIN range has significantly lower watts loss then major competitors
- Improves network efficiency by reducing unnecessary power losses

**Market leading watts loss performance**










# Watts Loss Comparison – 17.5kV

|  Bussmann |  Bussmann |  EFEN |  SIBA | MESA Watts loss |  ETI |  Merlin Gerin |  eliman |  INAE |  ABB |
|--|--|--|--|-----------------|---|--|--|--|---|
| Part Number  | Watts Loss   | Watts Loss   | Watts Loss   |                 | Watts Loss  | Watts Loss   | Watts Loss   | Watts Loss   | Watts Loss  |
| 17.5TDLSJ6.3   | 15   | -  | 25   | -               | -   | -  | -  | -  | 54  |
| 17.5TDLSJ10  | 23   | -  | 48   | 23              | -   | 23   | -  | -  | 41  |
| 17.5TDLSJ16  | 34   | -  | 37   | 47              | -   | 47   | -  | -  | 67  |
| 17.5TDLSJ20  | 38   | -  | 40   | -               | -   | -  | -  | -  | 52.6  |
| 17.5TDLSJ25  | 48   | -  | 56   | 72              | -   | 72   | -  | -  | 64  |
| 17.5TDLSJ31.5  | 58   | -  | 65   | 78              | -   | 78   | -  | -  | 56.7  |
| 17.5TDLSJ40  | 76   | -  | 84   | 90              | -   | 90   | -  | -  | 80  |
| 17.5TFLSJ50  | 62   | -  | 101  | -               | -   | -  | -  | -  | 90  |
| 17.5TDMEJ6.3   | 14   | -  | 31   | -               | -   | -  | -  | -  | 54  |
| 17.5TDMEJ10  | 24   | -  | 48   | -               | -   | -  | -  | -  | 41  |
| 17.5TDMEJ16  | 23   | -  | 37   | -               | -   | -  | -  | -  | 67  |
| 17.5TDMEJ20  | 27   | -  | 42   | -               | -   | -  | -  | -  | 52.6  |
| 17.5TDMEJ25  | 34   | -  | 56   | -               | -   | -  | -  | -  | 64  |
| 17.5TDMEJ31.5  | 41   | -  | 69   | -               | -   | -  | -  | -  | 56.7  |
| 17.5TDMEJ40  | 53   | -  | 84   | -               | -   | -  | -  | -  | 80  |
| 17.5TDMEJ50  | 69   | -  | 101  | -               | -   | -  | -  | -  | 90  |
| 17.5TDMEJ63  | 89   | -  | 106  | -               | -   | -  | -  | -  | 100   |
| 17.5THMEJ80  | 106  | -  | 137  | -               | -   | -  | -  | -  | 124   |
| 17.5THMEJ100   | 128  | -  | 182  | -               | -   | -  | -  | -  | 136   |
| 17.5TKMEJ125   | 146  | -  | 229  | -               | -   | -  | -  | -  | 175   |

- New 17.5kV DIN range has significantly lower watts loss than major competitors
- Improves network efficiency by reducing unnecessary power losses

**Market leading watts loss performance**

# Watts Loss Comparison – 24kV

|  Part Number |  Watts Loss |  Watts Loss |  Watts Loss | MESA Watts loss |  Watts Loss |  Watts Loss |  Watts Loss |  Watts Loss |  Watts Loss |
|---|--|--|--|-----------------|--|--|--|--|--|
| 24TDMEJ6.3  | 20   | 32   | 31   | 25              | 29   | 25   | 38   | 20   | 91   |
| 24TDMEJ10   | 32   | 48   | 52   | 31              | 19   | 31   | 36   | 42   | 62   |
| 24TDMEJ16   | 34   | 43   | 59   | 58              | 33   | 58   | 70   | 57   | 72   |
| 24TDMEJ20   | 38   | 53   | 46   | 67              | 47   | 67   | 73   | 60   | 61   |
| 24TDMEJ25   | 49   | 64   | 56   | 79              | 61   | 79   | 78   | 64   | 79   |
| 24TDMEJ31.5   | 59   | 85   | 72   | 96              | 81   | 96   | 83   | 77   | 98   |
| 24TDMEJ40   | 79   | 103  | 106  | 119             | 97   | 119  | 113  | 115  | 106  |
| 24TDMEJ50   | 99   | 146  | 108  | 136             | 81   | 136  | 148  | 112  | 130  |
| 24THMEJ63   | 127  | 163  | 132  | 144             | 125  | 144  | 178  | 140  | 147  |
| 24TFMEJ80   | 155  | 196  | 174  | 200             | 151  | 200  | 215  | 225  | 165  |
| 24TFMEJ100  | 400  | 400  | 234  | 240             | 228  | 240  | 224  | 260  | 186  |
| 24TXMEJ125  | 340  | 340  | 320  |                 | 301  | -  | -  | -  | 234  |
| 24TXMEJ160  | 515  | 515  |  |                 |  | -  | -  | -  | -  |

- **New 24kV DIN range has significantly lower watts loss for most ratings when compared to major competitors**
- **Improves network efficiency by reducing unnecessary power losses**

**Market leading watts loss performance**

**KEMA**

**TYPE TEST CERTIFICATE OF BREAKING**

APPARATUS Current limiting fuses

| Designation              | Rated voltage kV | Rated breaking capacity kA | Rated current A | Minimum breaking current A | Rated frequency Hz |
|--------------------------|------------------|----------------------------|-----------------|----------------------------|--------------------|
| 12TDLJ6.3                | 12               | 63                         | 6               | 3                          | 50                 |
| 12TDLJ10                 | 12               | 63                         | 6               | 3                          | 50                 |
| 12TDLJ16 (1)             | 12               | 63                         | 6               | 3                          | 50                 |
| 12TDLJ20 (1)             | 12               | 63                         | 6               | 3                          | 50                 |
| 12TDLJ25 (1)             | 12               | 63                         | 6               | 3                          | 50                 |
| 12TDLJ31.5 (1)           | 12               | 63                         | 6               | 3                          | 50                 |
| 12TDLJ40 (1)             | 12               | 63                         | 6               | 3                          | 50                 |
| 12TDLJ50                 | 12               | 63                         | 6               | 3                          | 50                 |
| 12TDLJ63                 | 12               | 63                         | 6               | 3                          | 50                 |
| 12TKLE30                 | 12               | 63                         | 6               | 3                          | 50                 |
| 12TKLE100, 12TKME100 (1) | 12               | 63                         | 6               | 3                          | 50                 |
| 12TKLE125                | 12               | 63                         | 6               | 3                          | 50                 |

(1) See notes on page 7.

**MANUFACTURER** Cooper Bussmann India Private Limited, Sedarapat, Pondicherry, India

**TESTED FOR** Cooper Bussmann (UK) Limited, Burton-on-the-Wolds, United Kingdom

**TESTED BY** KEMA HIGH-POWER LABORATORY, Utrechtseweg 310 - 6812 AR Arnhem - The Netherlands

**DATE(S) OF TESTS** 25, 26, 27 September, 18 October, 3 November 2006

The apparatus, constructed in accordance with the description, this Certificate, has been subjected to the series of proving tests in accordance with IEC 60282-1 clause 6.6 (test duty 1, 2 and 3).

This Type Test Certificate has been issued by KEMA following exclusively the STL. The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the Standard and to justify the ratings assigned by the manufacturer as listed on page 6.

The Certificate applies only to the apparatus tested. The responsibility for conformity with the same designations with that tested rests with the Manufacturer.

This Certificate consists of 208 sheets in total.

This Certificate falls under the scope of the accreditation certificate L 020 of the Dutch Council for Accreditation. See information sheet (page 2).

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KEMA Nedelands

P.G.A. Bus  
KEMA T&D Test  
Managing Director  
Arnhem, 17 April 2007

Version: 1

**KEMA**

**TYPE TEST CERTIFICATE OF BREAKING PERFORMANCE**

APPARATUS Current limiting fuses

| Designation                   | Rated voltage kV | Rated breaking capacity kA | Rated current A | Minimum breaking current A | Rated frequency Hz |
|-------------------------------|------------------|----------------------------|-----------------|----------------------------|--------------------|
| 17.5TDLJ6.3, 17.5TDLJ16.3 (1) | 17.5             | 60                         | 6.3             | 3.0                        | 50                 |
| 17.5TDLJ16, 17.5TDLJ10 (1)    | 17.5             | 60                         | 10              | 3.0                        | 50                 |
| 17.5TDLJ16 (1)                | 17.5             | 60                         | 16              | 3.0                        | 50                 |
| 17.5TDLJ25 (1)                | 17.5             | 60                         | 20              | 3.0                        | 50                 |
| 17.5TDLJ25 (1)                | 17.5             | 60                         | 25              | 3.0                        | 50                 |
| 17.5TDLJ31.5 (1)              | 17.5             | 60                         | 40              | 3.0                        | 50                 |
| 17.5TDLJ40 (1)                | 17.5             | 60                         | 50              | 3.0                        | 50                 |
| 17.5TDLJ50                    | 17.5             | 60                         | 60              | 3.0                        | 50                 |
| 17.5TDLJ63                    | 17.5             | 60                         | 63              | 3.0                        | 50                 |
| 17.5TKME100                   | 17.5             | 60                         | 100             | 3.0                        | 50                 |
| 17.5TKME100                   | 17.5             | 60                         | 100             | 3.0                        | 50                 |
| 17.5TKME125                   | 17.5             | 60                         | 125             | 3.0                        | 50                 |

(1) See notes on page 7.

**MANUFACTURER** Cooper Bussmann India Private Limited, Sedarapat, Pondicherry, India

**TESTED FOR** Cooper Bussmann (UK) Limited, Burton-on-the-Wolds, United Kingdom

**TESTED BY** KEMA HIGH-POWER LABORATORY, Utrechtseweg 310 - 6812 AR Arnhem - The Netherlands

**DATE(S) OF TESTS** 6, 7, 8 September 2006 and 15, 16 January, 1 February 2007

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with IEC 60282-1 clause 6.6 (test duty 1, 2 and 3).

This Type Test Certificate has been issued by KEMA following exclusively the STL. The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the Standard and to justify the ratings assigned by the manufacturer as listed on page 6.

The Certificate applies only to the apparatus tested. The responsibility for conformity with the same designations with that tested rests with the Manufacturer.

This Certificate consists of 195 sheets in total.

This Certificate falls under the scope of the accreditation certificate L 020 of the Dutch Council for Accreditation. See information sheet (page 2).

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KEMA Nedelands

P.G.A. Bus  
KEMA T&D Test  
Managing Director  
Arnhem, 17 April 2007

Version: 1

**KEMA**

**TYPE TEST CERTIFICATE OF BREAKING PERFORMANCE**

APPARATUS Current limiting fuses

| Designation    | Rated voltage kV | Rated breaking capacity kA | Rated current A | Minimum breaking current A | Rated frequency Hz |
|----------------|------------------|----------------------------|-----------------|----------------------------|--------------------|
| 24TDMJ6.3      | 24               | 60                         | 6.3             | 3.0                        | 50                 |
| 24TDMJ10       | 24               | 60                         | 10              | 3.0                        | 50                 |
| 24TDMJ16 (1)   | 24               | 60                         | 16              | 3.0                        | 50                 |
| 24TDMJ20 (1)   | 24               | 60                         | 20              | 3.0                        | 50                 |
| 24TDMJ25 (1)   | 24               | 60                         | 25              | 3.0                        | 50                 |
| 24TDMJ31.5 (1) | 24               | 60                         | 31.5            | 3.0                        | 50                 |
| 24TDMJ40 (1)   | 24               | 60                         | 40              | 3.0                        | 50                 |
| 24TDMJ50       | 24               | 60                         | 50              | 3.0                        | 50                 |
| 24TDMJ63       | 24               | 60                         | 63              | 3.0                        | 50                 |
| 24TFME100      | 24               | 60                         | 100             | 3.0                        | 50                 |

(1) See note on page 7.

**MANUFACTURER** Cooper Bussmann India Private Limited, Sedarapat, Pondicherry, India

**TESTED FOR** Cooper Bussmann (UK) Limited, Burton-on-the-Wolds, United Kingdom

**TESTED BY** KEMA HIGH-POWER LABORATORY, Utrechtseweg 310 - 6812 AR Arnhem - The Netherlands

**DATE(S) OF TESTS** 18 and 19 October 2006

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this Certificate, has been subjected to the series of proving tests in accordance with IEC 60282-1 clause 6.6 (test duty 1, 2 and 3).

This Type Test Certificate has been issued by KEMA following exclusively the STL. The results are shown in the record of Proving Tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the Standard and to justify the ratings assigned by the manufacturer as listed on page 6.

The Certificate applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designations with that tested rests with the Manufacturer.

This Certificate consists of 158 sheets in total.

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KEMA Nedelands B.V.

P.G.A. Bus  
KEMA T&D Testing Services  
Managing Director  
Arnhem, 17 April 2007

Version: 1

Complete short circuit tests as per 60282-1 2005 - 7 test reports covering 4 type tests, over 800 pages in total



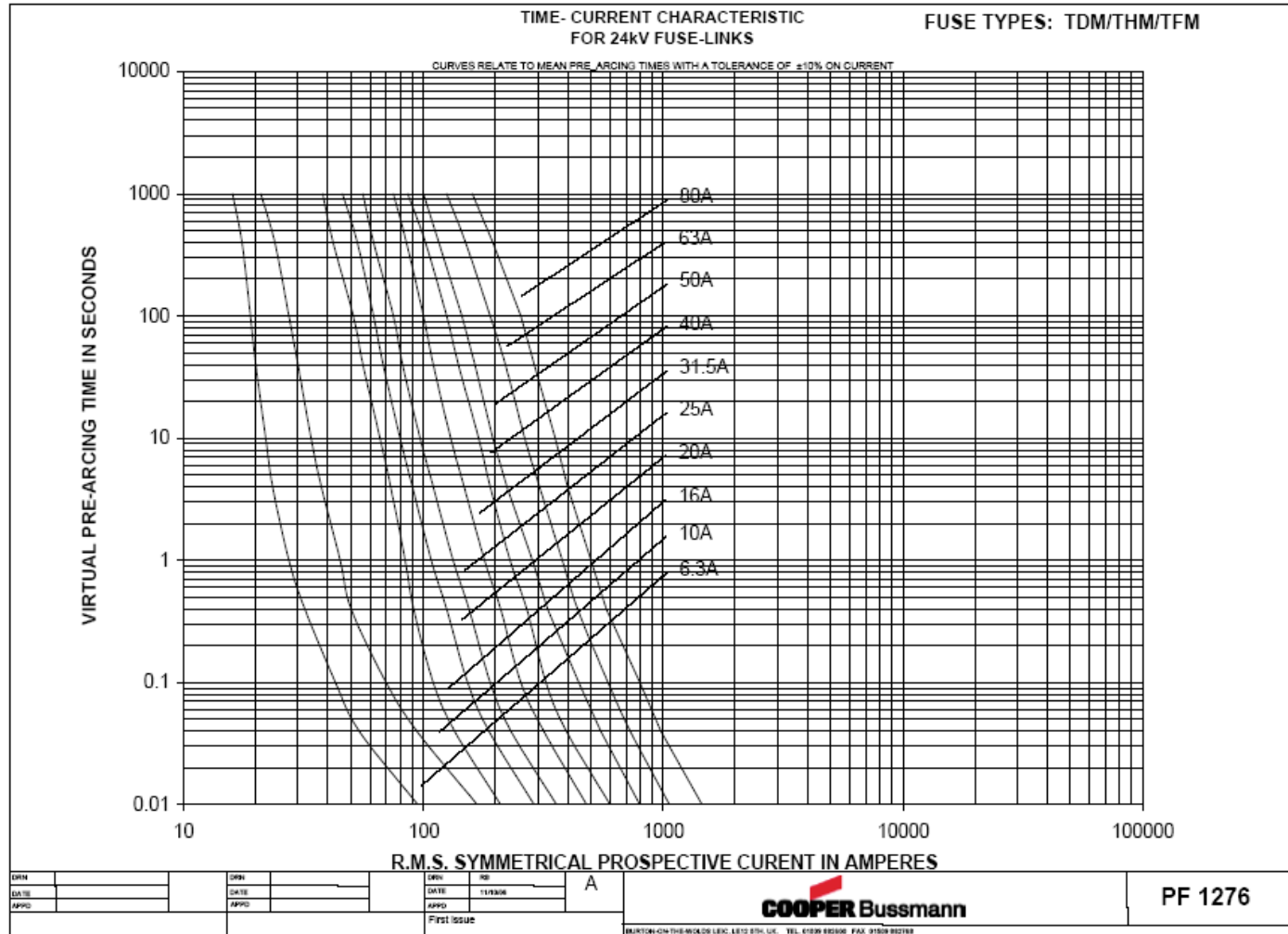
**All type tests completed to IEC 60282-1 2005. 3 test reports each containing 6 type tests, over pages total**

- **New MV DIN short form brochure**
- **Data sheets**
- **MV DIN conversion binders**
- **Data sticks – Electronic conversion binders**
- **German, Spanish versions to follow**
- **Selling sheets**
- **Price Lists**





# Technical Data – Time Current Curves



**Technical data available in Excel format - suitable for coordination studies**

- **Cooper Bussmann is THE world's leading fuse manufacturer**
- **Global sales and distribution network**
- **New MV DIN T range, fully certified to IEC 60282-1 2005 by KEMA, ASTA**
- **Mechanically robust design, 100% by X ray inspection**
- **Cooper Bussmann® designs are typically lower watts loss than those of the competition, reducing life-time ownership costs**
- **Use of M-effect in Cooper Bussmann® design ensures cool running at load current even in enclosure, reducing the need for de-rating**
- **Suitable for indoor and outdoor use – one design**
- **24 and 17.5 kV fuses can be used on a 12 kV system, reducing inventory**

***New T range – enables a safer and more productive world***