

## Element Metech electronic calibration documents

Element Metech electronic calibration documents are produced as PDF files and signed digitally. The documents are distributed by [Metech Instrument Organizer](#), to registered users or as download links/attachments in delivery notification mails. You can also get the calibration documents from the Element Metech web site via the report number and MIO Id.

If your calibration stickers have QR code, the calibration document can be opened directly in a mobile phone.

## Element Metech digital signatures

Element Metech digital signatures replace the hand written signatures in calibration documents (requirement EN ISO 17025, 5.10.2 j). A digital signature can be used to prove that a document was signed by the originator. In addition, a digital signature can also prove that a document has not been modified since it was signed.

A digitally signed document from Element Metech is signed with an Element Metech company certificate, authorized by the signer (as approver of the document). The signer is chained to the signature by the Element Metech domain security system. The Element Metech company certificates are chaining up to the Element Metech Root Certificate Authority (CA), issuing the certificates. The root CA public certificate can then be used, by the recipient, to verify that the signature was performed by an Element Metech company.

When the PDF document is opened in Adobe Reader, the signature is visible in the document (A). If the mouse pointer is moved over the signature field (A), the tool tip text (B) is visible. The text indicates whether the signature is valid or not.

The screenshot shows the Adobe Acrobat Reader interface with a PDF document titled "Element accredited calibration certificate SE.pdf". The document content includes the Element Metech logo, contact information, and a "CALIBRATION CERTIFICATE" section. The certificate details are as follows:

Field	Value
Certificate number	1106196-1
Edition	1
Calibration approved by	Stefan Westh, Technician
Date of issue	20 June 2018
Page (of)	1 (7)

The signature field is highlighted with a red circle (A). The tooltip text (B) is:

Digitally signed by Element Metech, 20 June 2018 13:31:51  
Signature performed by: Stefan Westh, Arboga  
Stefan Westh  
Valid signature

The certificate also includes the following information:

- CUSTOMER:** Exova METECH AB, PLA, "Egen utr", Valhallavägen 2, 771 80 LUDVIKA, Sverige
- DEVICE UNDER TEST:** Digital Multimeter, Agilent, 34401A, MIO-id: M395944, Serial No: MY47054050, Id No: KM-04, Firmware: 11-05-03
- COMMISSION:** Accredited calibration

## How to verify that a document is signed by Element Metech

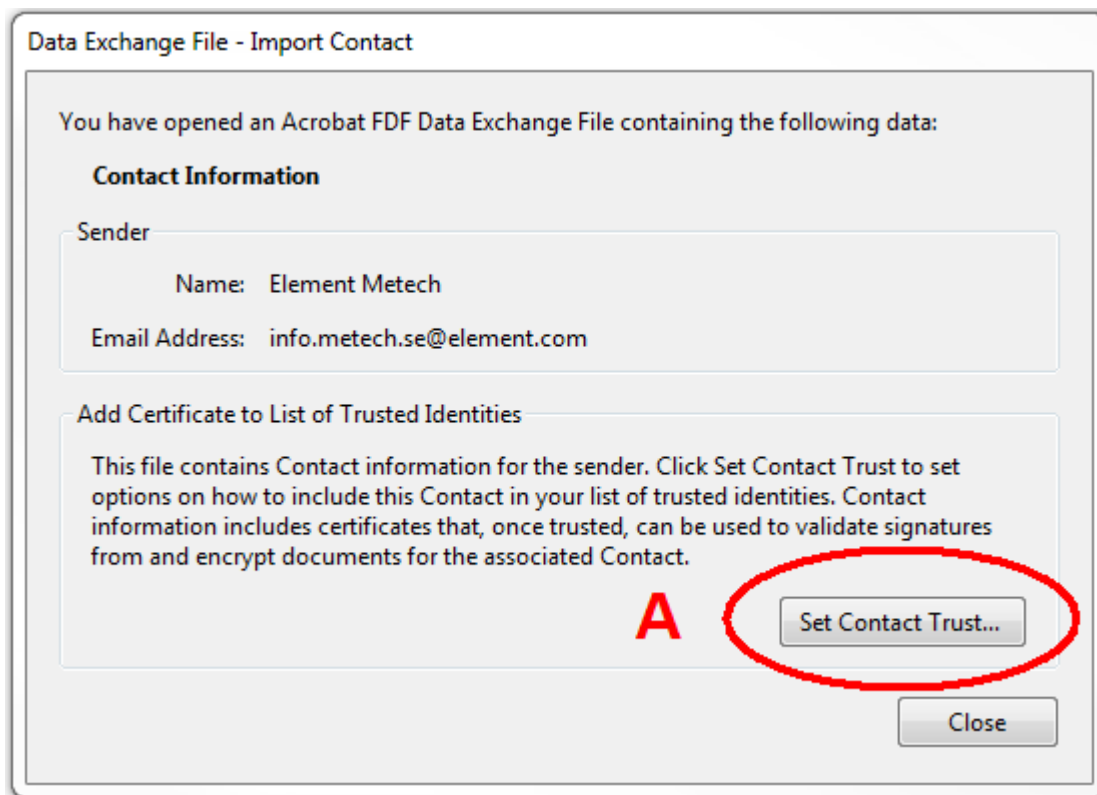
To verify the signature, you have to download and "Trust" the Element Metech Root CA public certificate. This is done once for each computer or profile, where verification should be possible. For large companies, root certificates can be trusted for the entire network domain. Contact your local IT department.

### Download and trust Element Metech digital signatures

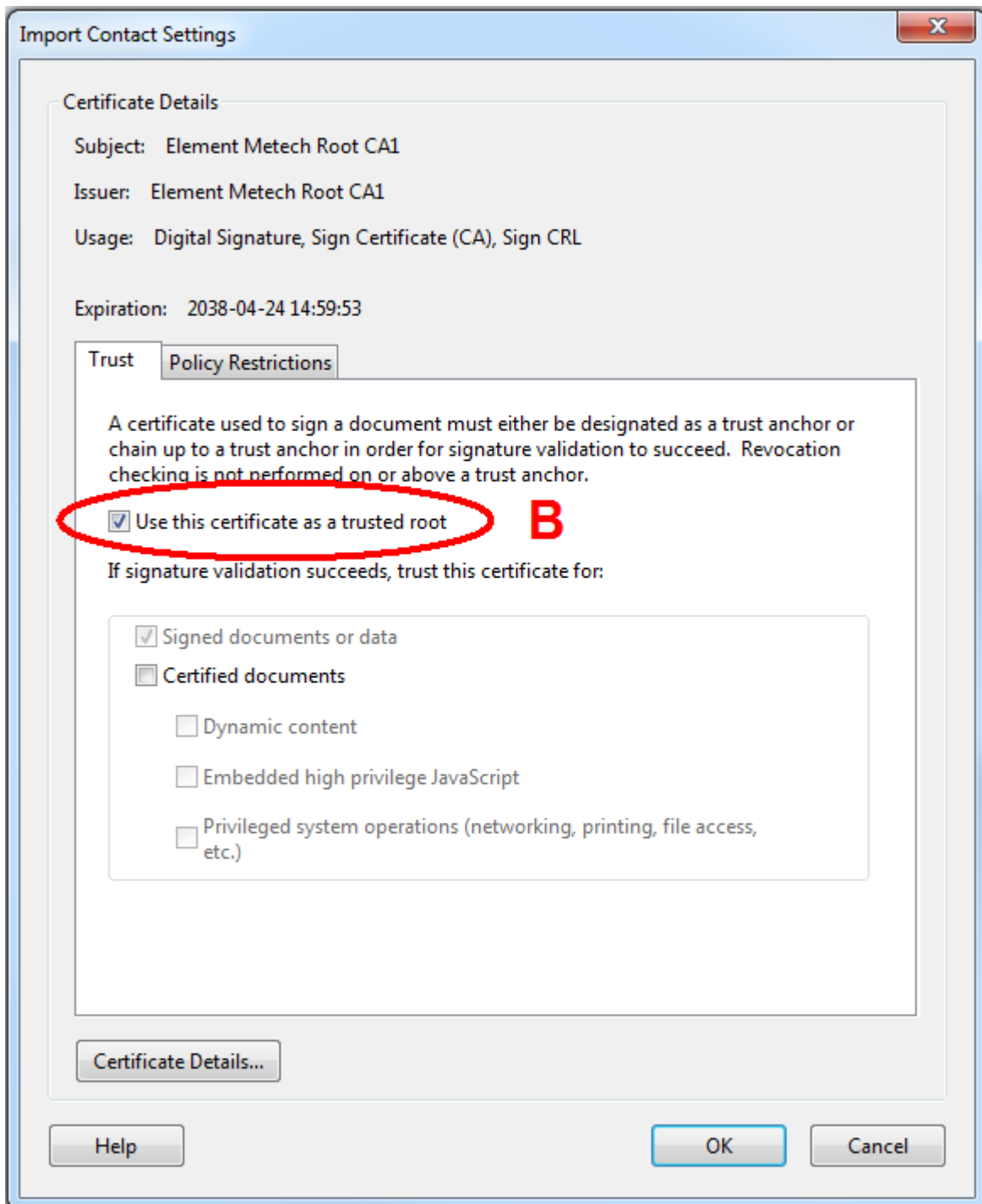
For users, not running Acrobat as PDF browser, [Element Metech Root CA certificate \(crt-file\)](#) and follow the instructions for your application to trust the certificate. If you are running, the recommended, Adobe Acrobat Reader, download [Element Metech Root CA certificate \(fdf-file\)](#).

(For certificates signed before 2018-06-25 by [Exova Metech](#), download [Exova METECH Root CA certificate \(crt-file\)](#) or [Exova METECH Root CA certificate \(fdf-file\)](#).)

Open the file and press **Set Contact Trust** (A).



Tick **Use this certificate as a trusted root** (B) and press **OK**.

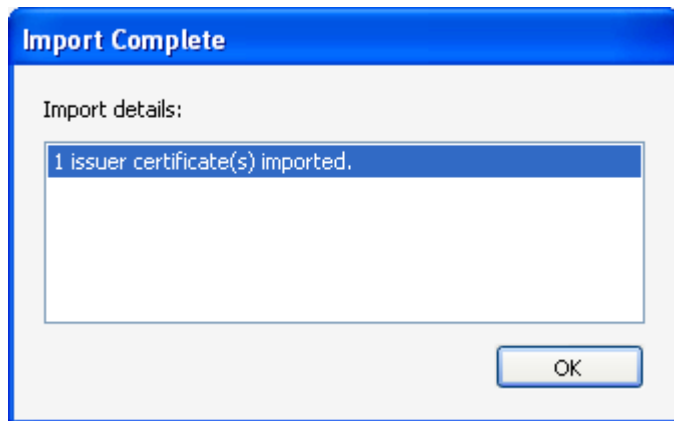


If the import was successful, it should look like the frame below.

Press **OK** to close this frame.

Press **Close** to finish the import.

Close the browser window to return to the information site.



The Element Metech Root CA public certificate is now trusted and all Element Metech signed documents, opened on this computer or profile, and validated according to instructions below, should indicate that the signature is valid.

### **Validate a signature and verify that the document has not been modified**

To validate the signature, right click in the signature field, and select **Validate Signature**. The Signature Validation Status should then indicate that the signature is VALID and that the document has not been modified. More information can be found by selecting **Show Signature Properties**.

Note: Element Metech does not provide Certificate Revocation Lists (CRL) to check for revoked certificates since it is a small number of certificates and they are only used in a secure server environment. The signature time stamp is from the server, performing the signature.

### **How does it work technically?**

The signer uses a pair of cryptographic keys, a private key and a public key. These keys are contained in certificate files, together with information about the signer. The private key is kept secret by the signer and the public key is published to anyone who needs it.

The signer calculates a "checksum" (hash) for the document to sign. The hash is then encrypted by using the private key. This is the digital signature and is included in the document file. The public key is also included in the document.

The recipient uses the public key to decrypt the hash. If this worked, it proves that the document was signed by the signers private key. The recipient then calculates the hash for the document and compares it to the decrypted hash, if it is the same, it proves that the document has not been modified.

Element Metech uses a two tier hierarchy for the certificates (key pairs). The highest level is the root Certificate Authority (CA). The CA uses a self-signed certificate to sign the issued certificates that are actually used to sign documents with. The CA public key can then be used to verify any signature, performed by any of the issued certificates.

To verify that the signature is performed by Element Metech, the recipient has to receive the Element Metech Root CA public key. If he is sure that the public key comes from Element Metech, he can import the public key (certificate file) as a trusted root. All certificates signed by Element Metech will then have the signature validation status "Valid" in the PDF browser.