## INTRODUCTION

The latest genomic routine international evaluation for **conformation traits** took place as scheduled at the Interbull Centre. Data from twenty (22) countries were included in this evaluation.

International genetic evaluations for calving traits of bulls from Australia, Belgium, Canada, Switzerland, Czech Republic, Germany, Denmark-Finland-Sweden, Spain, France, United Kingdom, Hungary, Ireland, Italy, Japan, Korea, The Netherlands, Norway, New Zealand, Poland, South Africa, Estonia, Slovenia, Portugal and the United States of America were computed. Holstein data were included in this evaluation.

BEL, CAN, DEU, ESP, FRA, AUS, DFS, GBR, ITA, NLD, POL submitted GEBVs.

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ang: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
bcs: BEL, CAN, DEU,    , FRA,    ,    , GBR, ITA, NLD,
bde: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
cwi: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
fan: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
ftl: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
ftp: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
fua: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
loc: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD,
ocs: BEL, CAN, DEU, ESP, FRA, AUS,    , GBR, ITA, NLD, POL
ofl: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
ous: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
ran: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
rlr: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
rls: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
rtp: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
ruh: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
rwi: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
sta: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
ude: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
usu: BEL, CAN, DEU, ESP, FRA,    , DFS, GBR, ITA, NLD, POL
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## CHANGES IN NATIONAL PROCEDURES

Changes in the national genetic evaluation of conformation traits are as follows:

DEU (HOL) Bulls older than 17 months year old and not selected yet have been removed from the national evaluation

ESP (HOL) Elimination of many Eurogenomics bulls from the national evaluation. These bulls had already MACE proof or have not been selected for AI

## INTERBULL CHANGES COMPARED TO THE DECEMBER ROUTINE RUN

No changes in Interbull procedures

## DATA AND METHOD OF ANALYSIS

Eleven Holstein populations sent GEBV data for up to 38 traits, while classical EBVs for the same traits were used in the analyses. Young bull GEBVs from the GEBV providers have been converted to the scales of all countries participating in classical MACE. A bull will get a MACE EBV or a GMACE EBV but not both.
From those eleven countries, National GEBVs of bulls less than seven years of age and with no classical MACE proofs were included for the breeding value prediction with a further requirement of either a MACE-PA or a GMACE-PA (for young genomic bulls with young genomic sires) being available.

## SCIENTIFIC LITERATURE

The international genetic evaluation procedure is based on international work described in the following scientific publications:


VanRaden, P.M. and Sullivan, P.G. 2010. International genomic evaluation methods for dairy cattle. Gen. Sel. Evol. 42:7

Sullivan, P.G. and Jakobsen, J.H. 2012. Robust GMACE for young bulls methodology. Interbull Bulletin 45, Article 1.

Sullivan, P.G. 2012a. GMACE reliability approximation. Report to the GMACE working group of Interbull. GMACE_rels 2013

Sullivan, P.G. 2012b. GMACE variance estimation. Report to the GMACE working group of Interbull. GMACE_vce 2013

Sullivan, P.G. 2012c. GMACE Weighting Factors. Report to the GMACE working group of Interbull. GMACE_gedcs 2013

Jakobsen, J.H. and Sullivan, P.G. 2013. Trait specific computation of shared reference population. Reference sharing Nov 2013


## NEXT ROUTINE INTERNATIONAL EVALUATION

Dates for next routine run can be found on http://www.interbull.org/ib/servicecalendar

## NEXT TEST INTERNATIONAL EVALUATION

Dates for next routine run can be found on http://www.interbull.org/ib/servicecalendar

## PUBLICATION OF INTERBULL ROUTINE RUN

Results were distributed by the Interbull Centre to designated representatives in each country. The international evaluation file comprised international proofs expressed on the base and unit of each country included in the analysis. Such records readily provide more information on bull performance in various countries, thereby minimizing the need to resort to conversions.

At the same time, all recipients of Interbull results are expected to honor the agreed code of practice, decided by the Interbull Steering Committee, and only publish international evaluations on their own country scale. Evaluations expressed on another country scale are confidential and may only be used internally for research and review purposes.

Table 1. National evaluation dates in GMACE run August 2016

| Country | Date |
|---|---|
| BEL | 20160801 |
| CAN | 20160801 |
| DEU | 20160809 |
| DFS | 20160809 |
| ESP | 20160721 |
| FRA | 20160811 |
| GBR | 20160801 |
| ITA | 20160629 |
| NLD | 20160801 |
| POL | 20160710 |

Table 2.

| Number of bulls in reference population for | | | | | | | | | sta |
|---|---|---|---|---|---|---|---|---|---|
| BEL | 2480.0 | | | | | | | | |
| CAN | 1243.0 | 30856.0 | | | | | | | |
| DEU | 909.0 | 2027.0 | 33099.0 | | | | | | |
| DFS | 823.0 | 1851.0 | 31075.0 | 31994.0 | | | | | |
| ESP | 856.0 | 1880.0 | 30563.0 | 30557.0 | 31337.0 | | | | |
| FRA | 958.0 | 2226.0 | 29295.0 | 29149.0 | 29420.0 | 31277.0 | | | |
| GBR | 810.0 | 24903.0 | 1851.0 | 1702.0 | 1713.0 | 2026.0 | 25251.0 | | |
| ITA | 713.0 | 24036.0 | 1470.0 | 1245.0 | 1259.0 | 1540.0 | 23921.0 | 24349.0 | |
| NLD | 936.0 | 2193.0 | 31625.0 | 31449.0 | 31078.0 | 29693.0 | 2006.0 | 1530.0 | 33342.0 |
| POL | 175.0 | 145.0 | 2489.0 | 2615.0 | 2622.0 | 2565.0 | 169.0 | 142.0 | 2621.0 | 2737.0 |

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Number of bulls in reference population for        cwi
-----------------------------------------------------
BEL  2480.0
CAN  1243.0 30852.0
DEU   908.0  2027.0 31886.0
DFS   822.0  1851.0 29996.0 30908.0
ESP   855.0  1880.0 29419.0 29510.0 30190.0
FRA   957.0  2226.0 28158.0 28110.0 28290.0 30126.0
GBR   810.0 24900.0  1851.0  1702.0  1713.0  2026.0 25248.0
ITA   713.0 24033.0  1470.0  1245.0  1259.0  1540.0 23919.0 24346.0
NLD   935.0  2193.0 30439.0 30386.0 29951.0 28581.0  2006.0  1530.0 32152.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        bde
-----------------------------------------------------
BEL  2465.0
CAN  1243.0 30856.0
DEU   909.0  2027.0 32541.0
DFS   823.0  1851.0 30631.0 31547.0
ESP   856.0  1880.0 30065.0 30143.0 30837.0
FRA   958.0  2226.0 28811.0 28745.0 28937.0 30792.0
GBR   810.0 24903.0  1851.0  1702.0  1713.0  2026.0 25251.0
ITA   713.0 24036.0  1470.0  1245.0  1259.0  1540.0 23921.0 24349.0
NLD   936.0  2193.0 31067.0 31004.0 30578.0 29208.0  2006.0  1530.0 32781.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        ang
-----------------------------------------------------
BEL  2438.0
CAN  1241.0 30417.0
DEU   900.0  2022.0 29333.0
DFS   815.0  1847.0 27512.0 28422.0
ESP   847.0  1875.0 27211.0 27341.0 27978.0
FRA   949.0  2221.0 25968.0 25957.0 26112.0 27934.0
GBR   808.0 24891.0  1846.0  1698.0  1708.0  2021.0 25232.0
ITA   711.0 24026.0  1465.0  1241.0  1254.0  1535.0 23912.0 24337.0
NLD   917.0  2186.0 27891.0 27905.0 27743.0 26394.0  1997.0  1524.0 29286.0
POL   173.0   145.0  2486.0  2612.0  2619.0  2562.0   169.0   142.0  2618.0  2734.0

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Number of bulls in reference population for        ran
-----------------------------------------------------
BEL  2481.0
CAN  1243.0 30856.0
DEU   909.0  2027.0 32978.0
DFS   823.0  1851.0 30954.0 31873.0
ESP   856.0  1880.0 30448.0 30442.0 31222.0
FRA   958.0  2226.0 29176.0 29030.0 29307.0 31158.0
GBR   810.0 24903.0  1851.0  1702.0  1713.0  2026.0 25251.0
ITA   713.0 24036.0  1470.0  1245.0  1259.0  1540.0 23921.0 24349.0
NLD   936.0  2193.0 31506.0 31330.0 30965.0 29574.0  2006.0  1530.0 33223.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        rwi
-----------------------------------------------------
BEL  2465.0
CAN  1243.0 30036.0
DEU   909.0  2027.0 33044.0
DFS   823.0  1851.0 31023.0 31942.0
ESP   856.0  1880.0 30510.0 30507.0 31284.0
FRA   958.0  2226.0 29241.0 29098.0 29367.0 31223.0
GBR   810.0 24903.0  1851.0  1702.0  1713.0  2026.0 25251.0
ITA   713.0 24036.0  1470.0  1245.0  1259.0  1540.0 23921.0 24349.0
NLD   936.0  2193.0 31570.0 31397.0 31025.0 29639.0  2006.0  1530.0 33287.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0
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Number of bulls in reference population for        rls
-----------------------------------------------------
BEL  2481.0
CAN  1243.0 30856.0
DEU   909.0  2027.0 33100.0
DFS   823.0  1851.0 31076.0 31995.0
ESP   856.0  1880.0 30564.0 30558.0 31338.0
FRA   958.0  2226.0 29296.0 29150.0 29421.0 31278.0
GBR   810.0 24903.0  1851.0  1702.0  1713.0  2026.0 25251.0
ITA   713.0 24036.0  1470.0  1245.0  1259.0  1540.0 23921.0 24349.0
NLD   936.0  2193.0 31626.0 31450.0 31079.0 29694.0  2006.0  1530.0 33343.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        rlr
-----------------------------------------------------
BEL  2455.0
CAN  1241.0 29925.0
DEU   903.0  2019.0 31001.0
DFS   817.0  1843.0 29166.0 30075.0
ESP   850.0  1872.0 28601.0 28713.0 29369.0
FRA   952.0  2218.0 27333.0 27320.0 27477.0 29247.0
GBR   807.0 24074.0  1842.0  1693.0  1704.0  2017.0 24414.0
ITA   712.0 23198.0  1462.0  1237.0  1251.0  1532.0 23096.0 23509.0
NLD   920.0  2183.0 29581.0 29564.0 29144.0 27781.0  1993.0  1521.0 30989.0
POL   174.0   145.0  2477.0  2610.0  2609.0  2552.0   169.0   142.0  2608.0  2724.0

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Number of bulls in reference population for        fan
-----------------------------------------------------
BEL  2466.0
CAN  1241.0 30851.0
DEU   908.0  2027.0 30910.0
DFS   823.0  1851.0 29299.0 30202.0
ESP   855.0  1880.0 28731.0 28835.0 29502.0
FRA   957.0  2226.0 27511.0 27468.0 27644.0 29487.0
GBR   808.0 24900.0  1851.0  1702.0  1713.0  2026.0 25244.0
ITA   712.0 24035.0  1470.0  1245.0  1259.0  1540.0 23920.0 24348.0
NLD   925.0  2191.0 29714.0 29686.0 29259.0 27920.0  2002.0  1529.0 31121.0
POL   174.0   145.0  2488.0  2615.0  2621.0  2564.0   169.0   142.0  2620.0  2736.0

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Number of bulls in reference population for        fua
-----------------------------------------------------
BEL  2481.0
CAN  1243.0 30855.0
DEU   909.0  2027.0 32282.0
DFS   823.0  1851.0 30387.0 31301.0
ESP   856.0  1880.0 29811.0 29900.0 30583.0
FRA   958.0  2226.0 28554.0 28502.0 28683.0 30531.0
GBR   810.0 24903.0  1851.0  1702.0  1713.0  2026.0 25251.0
ITA   713.0 24035.0  1470.0  1245.0  1259.0  1540.0 23921.0 24348.0
NLD   936.0  2193.0 30826.0 30772.0 30338.0 28969.0  2006.0  1530.0 32540.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        ruh
-----------------------------------------------------
BEL  2481.0
CAN  1243.0 30855.0
DEU   909.0  2027.0 31957.0
DFS   823.0  1851.0 30055.0 30942.0
ESP   856.0  1880.0 29486.0 29542.0 30229.0
FRA   958.0  2226.0 28236.0 28177.0 28364.0 30214.0
GBR   810.0 24902.0  1851.0  1702.0  1713.0  2026.0 25250.0
ITA   713.0 24036.0  1470.0  1245.0  1259.0  1540.0 23921.0 24349.0
NLD   936.0  2193.0 30492.0 30435.0 30006.0 28641.0  2006.0  1530.0 32205.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0
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Number of bulls in reference population for        usu
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BEL  2481.0
CAN  1243.0 30856.0
DEU   909.0  2027.0 33098.0
DFS   823.0  1851.0 31074.0 31993.0
ESP   856.0  1880.0 30562.0 30556.0 31336.0
FRA   958.0  2226.0 29294.0 29148.0 29419.0 31276.0
GBR   810.0 24903.0  1851.0  1702.0  1713.0  2026.0 25251.0
ITA   713.0 24036.0  1470.0  1245.0  1259.0  1540.0 23921.0 24349.0
NLD   936.0  2193.0 31624.0 31448.0 31077.0 29692.0  2006.0  1530.0 33341.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        ude
-----------------------------------------------------
BEL  2469.0
CAN  1241.0 30852.0
DEU   909.0  2027.0 33097.0
DFS   823.0  1851.0 31073.0 31992.0
ESP   856.0  1880.0 30561.0 30555.0 31335.0
FRA   958.0  2226.0 29294.0 29148.0 29419.0 31276.0
GBR   808.0 24900.0  1851.0  1702.0  1713.0  2026.0 25244.0
ITA   712.0 24035.0  1470.0  1245.0  1259.0  1540.0 23920.0 24348.0
NLD   926.0  2191.0 31623.0 31447.0 31076.0 29692.0  2002.0  1529.0 33038.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        ftp
-----------------------------------------------------
BEL  2481.0
CAN  1243.0 30856.0
DEU   909.0  2027.0 33052.0
DFS   823.0  1851.0 31028.0 31947.0
ESP   856.0  1880.0 30517.0 30511.0 31291.0
FRA   958.0  2226.0 29248.0 29102.0 29374.0 31230.0
GBR   810.0 24903.0  1851.0  1702.0  1713.0  2026.0 25251.0
ITA   713.0 24036.0  1470.0  1245.0  1259.0  1540.0 23921.0 24349.0
NLD   936.0  2193.0 31578.0 31402.0 31032.0 29646.0  2006.0  1530.0 33295.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        ftl
-----------------------------------------------------
BEL  2469.0
CAN  1241.0 30840.0
DEU   909.0  2027.0 33096.0
DFS   823.0  1851.0 31072.0 31991.0
ESP   856.0  1880.0 30560.0 30554.0 31334.0
FRA   958.0  2226.0 29293.0 29147.0 29418.0 31275.0
GBR   808.0 24900.0  1851.0  1702.0  1713.0  2026.0 25244.0
ITA   712.0 24035.0  1470.0  1245.0  1259.0  1540.0 23920.0 24348.0
NLD   926.0  2191.0 31622.0 31446.0 31075.0 29691.0  2002.0  1529.0 33037.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        rtp
-----------------------------------------------------
BEL  2458.0
CAN  1243.0 27722.0
DEU   907.0  2019.0 30719.0
DFS   821.0  1846.0 28946.0 29774.0
ESP   854.0  1874.0 28386.0 28451.0 29074.0
FRA   956.0  2220.0 27181.0 27127.0 27253.0 29053.0
GBR   810.0 23044.0  1845.0  1697.0  1707.0  2020.0 23386.0
ITA   713.0 22274.0  1465.0  1241.0  1254.0  1535.0 22164.0 22584.0
NLD   934.0  2171.0 29288.0 29268.0 28845.0 27526.0  1983.0  1508.0 30796.0
POL   174.0   145.0  2240.0  2341.0  2322.0  2264.0   169.0   142.0  2322.0  2424.0
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Number of bulls in reference population for        ocs
-----------------------------------------------------
AUS  2143.0
BEL   223.0  2464.0
CAN   439.0  1243.0 30840.0
DEU   382.0   908.0  2027.0 32469.0
ESP   369.0   855.0  1880.0 29940.0 30714.0
FRA   380.0   957.0  2226.0 28665.0 28797.0 30634.0
GBR   455.0   810.0 24887.0  1851.0  1713.0  2026.0 25235.0
ITA   309.0   713.0 24021.0  1470.0  1259.0  1540.0 23906.0 24334.0
NLD   480.0   935.0  2193.0 31022.0 30475.0 29090.0  2006.0  1530.0 32735.0
POL   107.0   175.0   145.0  2489.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        ous
-----------------------------------------------------
BEL  2459.0
CAN  1243.0 30855.0
DEU   909.0  2027.0 33100.0
DFS   823.0  1851.0 31076.0 31995.0
ESP   856.0  1880.0 30564.0 30558.0 31338.0
FRA   958.0  2226.0 29296.0 29150.0 29421.0 31276.0
GBR   810.0 24902.0  1851.0  1702.0  1713.0  2026.0 25250.0
ITA   713.0 24036.0  1470.0  1245.0  1259.0  1540.0 23921.0 24349.0
NLD   936.0  2193.0 31626.0 31450.0 31079.0 29694.0  2006.0  1530.0 33342.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        ofl
-----------------------------------------------------
BEL  2446.0
CAN  1241.0 30706.0
DEU   908.0  2027.0 32461.0
DFS   822.0  1851.0 30451.0 31367.0
ESP   855.0  1880.0 29932.0 29933.0 30705.0
FRA   957.0  2226.0 28658.0 28524.0 28789.0 30614.0
GBR   808.0 24774.0  1851.0  1702.0  1713.0  2026.0 25118.0
ITA   712.0 23931.0  1470.0  1245.0  1259.0  1540.0 23816.0 24244.0
NLD   925.0  2191.0 31014.0 30842.0 30466.0 29082.0  2002.0  1529.0 32403.0
POL   175.0   145.0  2489.0  2615.0  2622.0  2565.0   169.0   142.0  2621.0  2737.0

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Number of bulls in reference population for        loc
-----------------------------------------------------
BEL  2425.0
CAN  1235.0 24559.0
DEU   903.0  1998.0 26783.0
DFS   818.0  1824.0 25311.0 26017.0
ESP   850.0  1852.0 24915.0 24994.0 25512.0
FRA   952.0  2192.0 23593.0 23513.0 23741.0 25207.0
GBR   806.0 22158.0  1824.0  1675.0  1685.0  1992.0 22490.0
ITA   708.0 21504.0  1450.0  1226.0  1239.0  1520.0 21408.0 21761.0
NLD   919.0  2162.0 25607.0 25565.0 25301.0 23876.0  1973.0  1508.0 26806.0

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Number of bulls in reference population for        bcs
-----------------------------------------------------
BEL  2234.0
DEU   896.0 23681.0
FRA   945.0 20487.0 21953.0
GBR   803.0  1811.0  1980.0 21004.0
ITA   707.0  1438.0  1509.0 19917.0 20268.0
NLD   910.0 22549.0 20808.0  1955.0  1491.0 23757.0
CAN  1235.0  1984.0  2179.0 20692.0 20021.0  2143.0 24900.0
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